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ASSEMBLY

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STATE OF NEW YORK

ONE HUNDRED AND FORTY-FIRST SESSION

1918

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VOL. XXII.—NO. 43

ALBANY
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THIRTY-EIGHTH ANNUAL REPORT

OF THE

STATE DEPARTMENT OF HEALTH

OF

NEW YORK

For the Year Ending December 31, 1917

VOLUME I

ALBANY
J. B. LYON COMPANY, PRINTERS
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STATE OF NEW YORK

No. 43

IN ASSEMBLY

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THIRTY-EIGHTH ANNUAL REPORT

OF THE

STATE DEPARTMENT OF HEALTH

STATE OF NEW YORK

EXECUTIVE CHAMBER,

ALBANY, *March* 15, 1918.

To the Legislature:

I have the honor to transmit herewith the thirty-eighth annual report of the State Commissioner of Health for the year 1917.

CHARLES S. WHITMAN.

NEW YORK STATE DEPARTMENT OF HEALTH

Commissioner, HERMANN M. BIGGS, M.D., LL.D.

Deputy Commissioner, MATTHIAS NICOLL, JR., M. D.

Secretary, JOHN A. SMITH, M.D.

Assistant to Deputy Commissioner, B. R. RICKARDS, S.B.

Executive Clerk, FENIMORE D. BEAGLE

Directors of Divisions

Division of Sanitary Engineering.....Theodore Horton, C.E.
Division of Laboratories and Research.....Augustus B. Wadsworth, M.D.
Division of Vital Statistics.....Otto R. Eichel, M.D.
Division of Communicable Diseases.....Fred M. Meader, M.D.
Division of Child Hygiene.....Henry L. K. Shaw, M.D.
Division of Public Health Education.....

Consulting Staff

Bacteriologist.....William H. Park, M.D.
Animal Pathology.....Theobald Smith, M.D.
Communicable Disease.....Alvah H. Doty, M.D.
Surgeon.....George D. Stewart, M.D.
Dermatologist.....Frederic C. Curtis, M.D.
Pediatrician.....L. Emmett Holt, M.D., LL.D.
Statistician.....Walter F. Willcox, Ph.D.
Public Health Education.....C.-E. A. Winslow, S.B., M.S., Dr. P. H.
Orthopedic Surgeon.....Robert W. Lovett, M.D
Orthopedic Surgeon.....Royal Whitman, M.D.

Public Health Council

HERMANN M. BIGGS, M.D., LL.D., New York City, *Chairman*
JOSEPH A. WARREN, A.M., LL.D., New York City, *Secretary*

Mrs. Elmer Blair.....Albany
Chairman, Public Health Department, General Federation of Women's Clubs

Simon Flexner, M.D., LL.D.....New York City
Director, Laboratories of Rockefeller Institute for Medical Research

Homer Folks, LL.D.....Yonkers
Secretary, State Charities Aid Association

Henry N. Ogden, C. E.....Ithaca
Professor, Sanitary Engineering, Cornell University

T. Mitchell Prudden, M.D., LL.D.....New York City
Vice-President, Board of Scientific Directors, Rockefeller Institute for Medical Research

Wilhelm Gaertner, AM., M.D., Ph.D.....Buffalo
Attending Physician, German Hospital

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1918

THIRTY-EIGHTH ANNUAL REPORT OF THE STATE DEPARTMENT OF HEALTH

REPORT OF THE COMMISSIONER OF HEALTH

PART I

Letter of Transmittal

His Excellency, CHARLES S. WHITMAN, *Governor of the State of New York, Albany, N. Y.:*

SIR.— In presenting the annual report of the State Department of Health I desire to call your attention to certain problems of vital importance to public health, caused, or emphasized by the world war.

The work of the Department, while somewhat handicapped by the absence of members of the administrative staff, employees and health officers because of military duty, and notably increased by the necessity for cooperating with the federal authorities, has on the whole suffered but little in efficiency, largely on account of the addition to the field force granted in the last budget.

Among the preventable causes of death showing an increase during the year are those due to injuries caused by automobiles, which were responsible in 1917 for over 1,000 deaths — three times as many as in 1912 — and for more deaths than typhoid fever, scarlet fever and poliomyelitis combined. I earnestly recommend that educative and regulative measures for both pedestrians and drivers be introduced at the earliest possible moment as a means of reducing this unnecessary waste of life.

Among the problems emphasized by the revelations of the draft there is none of more importance to the people of this State and, indeed, to the world at large, than that of the control of venereal disease. A number of States have recognized this fact and have already appropriated large sums of money to be placed at the dis-

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posal of the departments of health to combat this menace to the progress of civilization. Thus far the State of New York has done very little in this field.

The State Department of Health, with such means as were available, has during the past year conducted a campaign of education by calling attention to the amendment to the Marriage Relations Law introduced at the last session of the Legislature, by the use of articles on social hygiene, which have been accepted by over 300 papers in the State for publication; by special articles on the subject of venereal disease in the *Health News*, and by lectures by members of the staff to the general public and at stated meetings of groups of health officers. The work of the laboratory in the diagnosis of venereal disease has grown enormously, an evidence of the increasing interest which the medical profession and laity are taking in this subject.

The Federation of Women's Clubs and the New York State Woman Suffrage Party are cooperating with the State Department of Health at the present time preparatory to taking part in the future campaign against these diseases. The Council of National Defense, the War Department, the Navy Department and the United States Public Health Service are all united in an effort to this end. The armies now fighting in Europe are literally riddled with venereal disease. A recent statement of Hecht of the Austrian Surgeon General's staff, made over his own signature in the *Vienna Medical Journal,* shows that up to the early part of last year 1,200,000 Austrian soldiers have been thrown out of the fighting by venereal disease. He recommends that men contracting these diseases behind the lines be sent to the firing line.

According to Stokes of the Mayo clinic at Rochester, Minnesota, prior to the war 10 per cent of all the entrants to the French hospitals were afflicted with syphilis. One and a half years after the war began the figure had risen to 16 per cent, and at the present time is 25 per cent. As the result of the disturbing reports coming from Europe, the Council of National Defense has divided this country into seven districts and has sent one physician into each of these districts to present to the State health departments a minimum program for the prevention and treatment of venereal disease, to the end that not only the army, but the civil popula-

tion may be protected. The proposed program is, in brief, as follows:

1. Establishment of a bureau of venereal diseases for the State departments of health with an adequate personnel.
2. Provision for the commitment of prostitutes and of all feeble-minded.
3. Reporting of venereal diseases, supplying free Wassermann examinations and free salvarsan, or one of its recognized substitutes.
4. Campaign of education.

Based on recent reports and investigations, it is my belief that at least 5 per cent of the total adult population of the State is affected with syphilis. Other estimates are much higher. Of the 40,000 insane approximate in the State, 13 per cent is known to be insane as a result of syphilis. From 20 to 25 per cent of all the adult persons who enter many of the hospitals in our large cities are afflicted with it.

While the importance of the prevention of venereal diseases as a sanitary problem can not be exaggerated, in the end the problem must be one affecting the civil population. Indeed, one has only to take the statistics of venereal disease among men entering the army from civil life in this country, to appreciate that this is the case. Thus, according to figures prepared by the Surgeon General computed on the annual rate per thousand for the twelve-week period, September 21 to December 7, 1917, 162.4 per 1,000 of the entrants to the National Army were afflicted with venereal disease; 115.2 of the National Guard; 88.0 of the Regular Army, and 121.9 of the three armies combined. These men entered the army from civil life from thousands of communities throughout the country. There can be little question that on their return there will be an equal or greater percentage of venereal disease among them, but even if happily this should not be the case, the evidence presented of the widespread prevalence of these diseases among the civil population makes the duty of the Federal and State governments perfectly clear; namely, to provide adequate means for an effective campaign for their prevention and adequate provision for the care and scientific treatment of those already afflicted. This is an obligation which the government cannot

escape, and which it should be glad to assume in behalf of the thousands of diseased and suffering men, women, and children now crying out for relief which is unobtainable, and in behalf of the thousands not yet born who must inevitably suffer from the same cause if no relief is forthcoming.

I can not too strongly urge upon you to give this matter your most serious consideration, and feel confident that your interest in the public health of the State, which has been manifested on so many occasions, may be counted upon to provide means to carry on a campaign for the prevention and cure of venereal disease in the State of New York.

Very respectfully yours,

HERMANN M. BIGGS,

Commissioner of Health

ANNUAL FINANCIAL STATEMENT

The expenditures of the Department for the fiscal year, July 1, 1916, to June 30, 1917, were as follows:

	Department exclusive of laboratories	*Division of laboratories*	*Total*
Personal service	$235,635 66	$88,254 72	$323,890 38
Maintenance and operation	137,980 37	110,270 23	248,250 60
	$373,616 03	$198,524 95	$572,140 98

Expenditures for maintenance and operation were:

	Department exclusive of laboratories	*Division of laboratories*	*Total*
Fuel, light and water	.....	$2,593 80	$2,593 80
Printing	$35,993 76	1,649 95	37,643 71
Advertising	255 66	.....	255 66
Equipment	14,487 93	14,684 77	29,172 70
Supplies	5,482 84	28,113 38	33,596 22
Traveling expenses	65,604 25	1,198 87	66,803 12
Communication	12,546 91	3,000 00	15,564 91
General plant service	1,054 02	619 98	1,674 00
Rents	2,055 00	480 00	2,535 00
Contingencies	500 00	11,904 52	12,404 52
Real estate—new laboratory site	.....	40,000 00	40,000 00
Construction	.....	3,198 00	3,198 00
Repairs	.....	2,826 66	2,826 66
Total	$137,980 37	$110,270 23	$248,250 60

PART II

Suggestions for Legislative Action

Pursuant to the provisions of section 12 of the Public Health Law, I have the honor to submit the following suggestions as to such legislative action as seems to me necessary for the better protection of life and health in this State:

Protection of Public Water Supplies

I would recommend that provision be made to enable this Department to exercise a constant supervision over the watersheds and the public water supplies of the State, the expenses incurred in supervision and inspection to be paid for by the municipalities or water companies owning or controlling such supplies.

I would also recommend legislation to simplify the present cumbersome procedure for the enforcement of the water rules made by this Department, and so to increase this Department's authority that it may properly enforce these rules and require the installation of purification processes where such are necessary.

The Slaughter of Diseased Animals

The United States government regularly inspects all animals slaughtered which become the subject of interstate commerce. These furnish a very large proportion of all the meat consumed in this State, especially in the larger cities. There are, however, a large number of cattle in rural communities which are slaughtered and sold for food without inspection. Many slaughter-houses are operated in an insanitary manner, and many carcasses of diseased animals, whose meat is unfit for food, are sold without inspection for human consumption.

I would, therefore, recommend that suitable amendment of the Farms and Markets Law be made so that there be established a Veterinary Bureau in the Council of Farms and Markets which shall take cognizance of the prevalence of tuberculosis in cattle and which shall exercise a sanitary supervision over all slaughter-houses not subject to Federal or municipal inspection and shall inspect all animals slaughtered therein and have power to condemn therein all meat unfit for food.

Safeguarding of Meats and Foods

Article IV of the Public Health Law, enacted in 1881, charges the State Department of Health with the duty of "taking cognizance of the interests of the public health as affected by the sale or use of food and drugs and the adulterations thereof, and making all necessary inquiries and investigations relating thereto."

In 1893, by an amendment to the Agricultural Law, many of these duties were also imposed on the Department of Agriculture. Article IV of the Public Health Law, however, has never been repealed, but in accordance with an original understanding between the two departments, no appropriation has been asked for its enforcement by the Department of Health, but an appropriation has been regularly asked for and received by the Department of Agriculture.

Most aspects of the general supervision of foods, other than milk and meats, are commercial, the purpose of such supervision being to prevent fraud rather than to protect health. There are, in my opinion, other activities which will bring larger returns in the saving of life for the amount of money expended and consequently I have not asked for any appropriation for the enforcement of this article of the Public Health Law.

Inspection of Kitchens and Food Utensils in Public Places

There is another article in the Public Health Law which is not enforced for lack of appropriation.

Chapter 552 of the Laws of 1913, being Article 17a of the Public Health Law, deals with cleanliness in the preparation and service of food. The State Commissioner of Health is given power to inspect and supervise any hotel, public restaurant, public dining-room, dining-car or steamboat, and public, penal, or charitable institutions and all public places in which food is prepared, sold or served. His agents are authorized to enter the kitchens of these places to see that the dishes and other utensils used in the preparation of food have been properly cleansed, and the commissioner is given power to enact rules and regulations for the proper enforcement of this article. No appropriation has ever been made to this Department to enable the commissioner to carry out the duties thus imposed upon him.

Either a sufficient appropriation should be granted to enforce the provisions of this article or it should be repealed.

I have not asked for such an appropriation because of the necessary increases in the Department's budget for other purposes and because I believe that there are other lines of public health work in which the money can be more profitably expended.

Medical Practice Act

Under the present law, whereby illegal practitioners of medicine are prosecuted by the county medical societies, it is well-nigh impossible to secure convictions. Medical societies are not unnaturally accused of prejudice, and juries, feeling as they frequently do, that actions are brought through motives of jealousy or pecuniary interest, rarely convict physicians of the illegality charged.

I would, therefore, recommend that the Public Health Law be so amended that the authority to initiate and maintain prosecutions for violation of the Medical Practice Act be vested exclusively in some State department, preferably a disinterested body, such as the State Board of Regents.

Centralization of Health Units

In many instances in smaller localities it is impossible to obtain efficient health officers. This is because there is no man really qualified for the position within the jurisdiction in some cases, while in others the sparsity of the population makes the salary so small that a competent man will not take the office. Furthermore, there is no centralization or coordination among the various health units existing in the county and work is duplicated and money wasted.

It would seem desirable to have the county organized as a health unit centering around a general or county hospital situated in a populous section of the county and having adequate provision for the care of the various communicable diseases, including wards or buildings for the care of the tuberculous and for acute venereal infections. Such a hospital should also make provision for a general dispensary, a tuberculosis, and a venereal disease dispensary. It should also house a child welfare station, a county laboratory and the offices of the county health officer, who would direct all

of the health activities in the county, including those of the deputies. By such an organization a tremendous step in advance will be taken in the interests of public health.

I would, therefore, recommend that legislation be enacted giving boards of supervisors power to establish such a system.

Reports of Communicable Diseases by Laboratories

All physicians and other persons having knowledge of communicable diseases are now required to report the same to their health officer. This is a most important step in the prevention of the spread of such diseases. It seems to me that laboratories which examine specimens and find in such specimens evidence of communicable disease should be required to report the same at once to their local health officers.

Venereal Disease

On account of conditions incident to the war and the prevalence of venereal diseases in the local population as shown by reports from the Surgeon General's office since the mobilization of our troops, the problem of the control and suppression of venereal disease becomes one demanding our immediate attention. It seems to me essential that there be established in the Department a bureau of venereal disease with a sufficient appropriation provided for the purpose of carrying on a campaign of education in regard to these diseases throughout the State, and to provide for instruction in modern methods of diagnosis and treatment for health officers and physicians, including the furnishing of salvarsan.

This has been strongly advocated by the Federal authorities.

Licensing of Pasteurizing Plants

During the past year the Department has conducted an inspection of various pasteurizing plants throughout the State, and such examination discloses that in many instances the plants are not up to standard. It seems to me that all pasteurizing plants should be licensed by the State Commissioner of Health and made subject to his control and supervision.

PART III

SUMMARY OF WORK OF DIVISIONS

Division of Administration

The Division of Administration, in addition to exercising general executive supervision of the work of the various divisions whose summarized reports are appended, is also called upon to undertake various other public health activities which do not come under the work of any one division. A brief outline of these activities follows:

Public Health Education

The cooperation of the public is essential to progress in hygiene and sanitation, but this cooperation can be secured only when the public is fully informed on these subjects. Health administrators, therefore, regard the education of the people in matters relating to the preservation of health and the prevention of disease as of vital importance. This Department, in common with other State Departments of Health, has put much time and thought into the preparation of instructive circulars and pamphlets, public lectures, exhibits and other methods of putting the facts before the people.

The *Health News*, containing articles of general interest on various phases of public health work, has been issued monthly to health officers and others whose duties or interests bring them in touch with this Department. The *Official Bulletin*, issued twice a month, is the channel by which official orders and announcements of a general character are brought to the attention of health officers and others officially engaged in public health work.

In addition to the regular publications, pamphlets and circulars on various subjects pertaining to the prevention of disease or the preservation of health have been issued from time to time throughout the year. When special conditions have arisen, such as outbreaks of disease or when a new activity is to be inaugurated, press notices have been issued to the papers of the State. In other cases, where it was desirable to obtain wide publicity on any particular subject in order to obtain the cooperation of the people,

so called "boiler plate" has been sent to such papers as indicated their desire for the service.

Exhibits

Owing to the special importance of disseminating information regarding food, its nutritive values, and how food and health could both be conserved by wise selection and proper cooking, the food exhibit has been given first place in the attention of the supervisor of exhibits. This exhibit has been shown at all the county fairs held in the State and at all principal towns along the main line of the New York Central railroad, and will eventually be shown over the entire State. It is accompanied by two members of the staff who give public lectures in connection with the exhibit.

The Child Welfare exhibit has been shown in 11 places, the miniature traveling exhibits in 76 public libraries and the moving picture health plans in 40 towns and villages. Lantern slide lectures have been given in 39 towns and villages.

County Tuberculosis Hospitals

Chapter 469 of the Laws of 1917 made mandatory the erection of a tuberculosis hospital in every county of over 35,000 population, unless already having such a hospital approved by the Commissioner of Health. In all twenty counties were affected.

The law imposed on the State Department of Health, in conjunction with the health officer, the duty of approving the sites offered by the town supervisors. The plans for the building and the equipment to be provided are likewise subject to the approval of the Department. In order to aid the supervisors, who for the most part were unfamiliar with the matter, it was necessary to hold numerous interviews with such local county authorities. As a further aid to them, a printed circular was issued by the Department indicating the essential features of hospital sites. The Supervisor of Tuberculosis, in conjunction with the Engineering Division, made preliminary informal inspections of numerous sites in many counties, in some instances over 20 sites being appraised for this purpose in a single county. A total of 100 sites in thirteen counties has been inspected. (See report of Engineering Division.)

The approval of plans for these hospitals has been facilitated by the appointment of an architect by the Department, who has been in constant conference with the members of building committees of the boards of supervisors, and with architects employed by them, and who has prepared plans for tuberculosis hospitals of various capacities as a guide. Inspections of hospitals in course of construction have been inaugurated.

Action has been taken by all of the twenty counties affected by the law, either by the appointment of supervisors' special committees, by the selection of sites, by the acquisition of sites already approved, by negotiating with architects, or by the letting of contracts. The Department has inspected sites in all of the twenty counties affected, with the exception of Sullivan and Washington, which counties have appointed site committees.

Site hearings have been held in thirteen counties, eleven sites being approved and two disapproved.

Plans are being prepared or considered in six counties, and have been approved in five others in four of which construction is already under way.

The tuberculosis committee appointed by the commissioner in July has held frequent meetings, at which the situation in various counties affected by this law has been carefully considered, action decided upon, and a Statewide program adopted for the coming year.

Poliomyelitis After-Care Clinics

The first series of after-care clinics, started during 1916, was continued during the early part of 1917 under the oversight of Dr. Robert Lovett and two assistants. In all 1,427 new and 315 old cases were examined and treatment prescribed. Early in the year field nurses were assigned to districts and the follow-up of the clinics was begun, the work being carried on entirely by the field nurses in their districts, assisted by two muscle testers.

The second series of clinics was started with two units and later reduced to one. In this series 858 patients were re-examined and 743 new patients were seen. Altogether a total of 3,379 individual examinations were made.

During these two series 178 pieces of apparatus were purchased by the patients or their families, or provided through the State

Charities Aid Association, which has rendered most valuable assistance throughout the year in carrying on the after-care work. In some of the smaller and more compact districts all of the patients seen at the clinics were visited several times by the nurse during this period; in the larger and more scattered districts less frequent visits were the rule.

On July 1, Dr. Le Roy Hubbard was appointed orthopedic surgeon. His duties consisted largely in visiting the different districts to assist the field nurses, in examining patients who had never been to a clinic but needed treatment, and in taking measurements for new apparatus or modifying the clinic instructions. During these three months practically the whole State was covered and more than 200 patients seen.

In October the third series of clinics was started, the unit consisting of the orthopedic surgeon, an executive nurse, a chief examiner, and two muscle testers who also acted as assistant examiners. Since that date clinics have been held in 38 cities and towns, and 923 patients have been examined. There were 337 pieces of apparatus ordered and 311 pieces delivered during the last series of clinics. The problem of the old cases, most of which had serious deformities requiring operations, was finally solved by referring many of them to the State Hospital for Crippled Children at West Haverstraw, and the Hospital for Ruptured and Crippled in New York City.

The results of these operations have been most gratifying. Many patients who had not walked for years are now able to walk with the aid of braces and crutches and are thus permitted to attend school or partially to earn a living. Other old and neglected cases, not so serious, have been made more comfortable by the application of proper braces and shoes.

It is safe to state that at least 75 per cent of the 1916 cases could not, for financial or geographical reasons, have received expert orthopedic treatment and care unless the State had brought it to them. Without such treatment the ultimate result would have been deformities or crippling which, in many cases, would have made the individual a charge on his respective community.

Of the cases attending clinics regularly, the examinations made during the last series showed 82 per cent recovered or materially improved.

The constant and regular supervision by the field nurse has prevented the occurrence of permanent deformities and contractions, as they were discovered early when they could be easily corrected, thus preventing serious and extensive operations.

The same kind of work and supervision should go on, or what has been done in many cases will be rendered useless. Babies are now reaching the walking age and must be assisted; children who are wearing braces are growing, and the apparatus must be lengthened or modified in order to be efficient. The critical period is when improvement begins and the child is allowed, and perhaps encouraged, to overexercise the weakened muscles and nerve cells. The parents become discouraged unless there are frequent visits from the nurse, and an opportunity is given to attend clinics and to learn the condition of the child by re-examinations and the comparison of records. The State Hospital, with its limited capacity, can not take care of all the patients needing treatment. Unless the home treatment is continued, many will lose what they have gained or grow worse.

Bureau of Habit-forming Drugs

Following the report of the Special Joint Legislative Committee to investigate habit-forming drugs, the Legislature of 1917 enacted a bill generally amending the public health law in reference to the sale and use of such narcotics. To meet the requirements of this law, the Department organized the Bureau of Habit-Forming Drugs. On June 28, 1917, the Bureau sent out to wholesale and retail druggists, physicians, dentists and veterinarians over 27,000 letters enclosing the necessary forms and blanks for registry and for inventory of habit-forming drugs in stock as of July 1, 1917, following these later with the same number of copies of the law. Since that date there have been filed 16,200 applications and inventories. The same number of official registry numbers have been assigned and books of 50 official order blanks issued in triplicate to each purchaser bearing his name on each blank.

The law states that the triplicate copy of each order for drugs must be " forthwith " filed with the State Department of Health, except in cities of the first class — New York, Buffalo and

Rochester. (In these cities the copies must be filed with the local departments of health.) About 10,000 of these copies have been received in the last four months and filed by the Bureau. A file is also kept of all physicians and institutions reporting treatment of addicts, with a separate file of all addicts so reported.

That all physicians, dentists, veterinarians and druggists have not fully understood the necessity of filing applications and inventories is evidenced by the continued daily receipt of requests for forms and blanks.

Under the provisions of the law the Commissioner of Health has adopted rules and regulations governing the dispensing of habit-forming drugs by local health boards.

Public Health Nursing

During the past year the State has been divided into thirteen districts, each in charge of a public health nurse and a nurse trained in the after-care of infantile paralysis. The nurses, working in cooperation with the sanitary supervisors of their respective districts, have investigated 49 outbreaks of communicable disease, have made tuberculosis surveys of five different counties, and have conducted child welfare exhibit in 16 different municipalities, at which addresses were made by these nurses on the subject of child welfare. Little Mothers' Leagues were formed by nurses in ten municipalities, making a total of 18 leagues now established in the State, having a total membership of 486.

In addition, the registration of births has been investigated in 17 municipalities in the State and rural health surveys have been conducted in 15 others. A rural obstetric investigation was made in Dutchess County.

Two nurses have been in attendance upon the food exhibits shown in 25 municipalities during the summer and fall. One of these nurses has continued with a traveling exhibit, giving talks and exhibits daily, visiting a different municipality each week.

The after-care nurses in charge of their respective districts have an average of 293 poliomyelitis cases to visit for instruction in muscle training, adjustment of braces, and application of plaster. In addition 72 of these patients have been brought to hospitals

for operations for the correction of deformities as a result of the after effects of the disease. These supervising after-care nurses also secured the attendance at clinics of all cases in need of further examination by the orthopedic surgeons of the Department.

One of the nurses has been permanently assigned to the supervision of midwives and has arranged for classes of instruction to be conducted for the proper training of all midwives in the State. Midwife prosecutions have been conducted in two municipalities.

The Department contemplates, during the coming year, the holding of a series of tuberculosis clinics throughout the State, in order to render assistance to local physicians in the early diagnosis of their cases and to afford them access to the newer methods of diagnosis and treatment.

The State supervising nurses will cooperate with the physicians in securing the attendance of their patients at these clinics, when physicians desire it, and will also maintain a proper system of follow-up of the cases in their homes.

Consolidated Health Districts

During the year 11 health districts have been consolidated through the efforts of the Department. By such consolidation, it is possible to secure greater coordination and also greater efficiency. A total of 1,449 health districts in the State are now represented by 1,076 health officers. Seventy-seven districts have the question under advisement.

Hearings

It becomes necessary from time to time for the Commissioner or Deputy to hold quasi-judicial hearings on violations of the sanitary code, the pollution of streams, etc., under powers conferred on them by the public health law. Forty-five such hearings have been held during the year.

Venereal Diseases

In years past, progress in preventing venereal disease has been unsatisfactory, owing to the general feeling that the subject should not be publicly discussed. This attitude has been gradually changing, until now, with the startling disclosures of the selective

draft, the public is in a receptive state. At the suggestion of the Commissioner, a committee on venereal disease, composed of certain of the administrative officers, was appointed in August. It was decided that the most effective method of making progress would be by the means of education and treatment. With this in view an active campaign of education was instituted, directed toward the medical profession and the public by means of addresses before medical societies, mass meetings, etc. Venereal disease clinics have been started in three cities. Lecture material has been collected for the use of health officers and others. Several thousand copies of the pamphlet "Over the Top" were sent to the various exemption boards throughout the State and distributed by them to the men appearing before them. Venereal disease circulars have been widely distributed. Placards calling attention to venereal diseases have been ordered and will be put up in various public places. Also placards have been furnished marriage license clerks throughout the State, calling attention to the amendment to the Marriage Relation Law. A series of six newspaper articles on social hygiene has been published by over 300 newspapers in the State.

Courses in Public Health

Over one-third of the health officers of the State have completed or are now taking one of the courses in public health offered by four of the universities. As a certificate in public health is now prerequisite for appointment, this number should be materially increased by the end of another year. As a factor in increasing efficiency and enthusiasm this requirement can not be overestimated.

Routine Matters

The general routine clerical work of the Department is under the supervision of the Executive Clerk who also is in charge of the nontechnical employes. The Executive Clerk also audits the accounts of the Department.

The constant increase in the routine work of the Department is evident from the following table:

Mail Record

INCREASE IN ACTIVITIES OF THE DEPARTMENT SINCE THE REORGANIZATION IN 1913 AS SHOWN BY THE FOLLOWING TABLE.

Mail received	1913	1914	1915	1916	1917
First class mail—pieces.	56,624	80,837	113,907	138,373	162,381
Reports from local registrars	15,630	17,150	17,273	18,759	17,513
Reports from local health officers	15,575	15,897	21,206	24,602	19,118
	87,829	113,884	152,386	181,734	199,012
Shipments					
First class	77,182	120,550	174,206	184,860	226,889
Second class	119,263	206,745	302,885	468,060	479,395
	196,445	327,295	477,091	652,920	706,284

Receipts

Increase — 1914 over 1913 — 26,055 pieces, or 30 per cent.
Increase — 1915 over 1914 — 38,502 pieces, or 34 per cent.
Increase — 1916 over 1915 — 29,348 pieces, or 19 per cent.
Increase — 1917 over 1916 — 17,278 pieces, or 10 per cent.
Increase — 1917 over 1913 — 111,183 pieces, or 126 per cent.

Shipments

Increase — 1914 over 1913 — 130,850 pieces, or 66 per cent.
Increase — 1915 over 1914 — 149,796 pieces, or 46 per cent.
Increase — 1916 over 1915 — 171,752 pieces, or 36 per cent.
Increase — 1917 over 1916 — 53,364 pieces, or 8 per cent.
Increase — 1917 over 1913 — 509,839 pieces, or 259 per cent.

Division of Communicable Diseases

During 1917 the supervision of the activities of the staff of district sanitary supervisors has devolved upon the Director of

the Division of Communicable Diseases, as has also the custody and supervision of the monthly reports of the 1,076 local health officers. The numerous routine duties resulting have necessitated curtailment of some of the intensive work which might otherwise have been done in connection with the study and control of communicable diseases.

In June Dr. Fred. M. Meader, Director of the Division, was called into military service as a captain in the Medical Officers Reserve Corps, and Dr. Paul B. Brooks, of Norwich, N. Y., Sanitary Supervisor, was appointed acting director. A number of temporary changes, largely incidental to the war, have also occurred in the staff of sanitary supervisors. During the year two epidemiologists have been appointed and have already rendered valuable service.

Activities of Sanitary Supervisors

During the widespread epidemic of poliomyelitis in 1916 there was for the first time a general appreciation of the advantage of having a corps of trained sanitary officers stationed throughout the State. During 1917 the field staff has rendered no less effective, if somewhat less conspicuous, service. In numerous other instances the efforts of sanitary supervisors, at times assisted or directed by epidemiologists, have contributed materially to the control or suppression of outbreaks of communicable disease. One instance is worthy of mention: In a municipality in which an outbreak of typhoid fever occurred, the health officer himself was found ill with the disease, and the other local physicians were either in military service or incapacitated. The sanitary supervisor discovered the source of infection and brought the outbreak under control. While so engaged he acted for the health officer, investigated several other outbreaks in the vicinity — one in an institution for children — and on several occasions acted as medical attendant in emergencies, in one of which he spent the night attending a maternity case.

With the present number of sanitary supervisors the average number of local health units in each district is eighty. The average population of each sanitary district is 316,200, and each has approximately seventy-two health officers. Several of the

supervisors are required to cover districts of not less than 360 square miles.

During 1917 the supervisors have investigated 832 outbreaks of communicable disease, have advised or assisted local health officers in 3,980 instances, have given 389 addresses on subjects pertaining to public health, have met with 361 local boards of health and held 12 district conferences of health officers, while the records of their activities show innumerable other important duties performed. The constant and increasing demand on the part of local health officials for advice and assistance from their sanitary supervisors indicates in some degree the value of the service rendered. On the other hand, opportunity for frequent association with skilled sanitarians is having an appreciable influence in improving the standards maintained by local health officers.

During the year several of the supervisors have served as members of or medical examiners for local selection boards. Several have also served upon State advisory committees for the consideration of special phases of public health work. In this connection those supervisors who have evinced particular interest and ability in certain fields of public health activity are being encouraged to develop such special talents to the greatest possible degree. Thus the State is in a position, when occasion requires, to furnish highly specialized service in the field.

Communicable Disease Control

During the year the frequent changes in local health officers, the establishment of army camps and movement of large bodies of men, changes in the Department's field staff, and other conditions incidental to the war, have given rise to new problems and have made the control of communicable diseases particularly difficult.

Not only have outbreaks of typhoid fever been investigated and controlled, but, so far as practicable, individual cases have been investigated with a view to determining and eliminating sources of infection. A special effort has also been made to encourage local health officers to investigate such cases, and where necessary they have been instructed in epidemiological pro-

cedures in connection with this and other prevailing communicable diseases. Both upstate and in the State as a whole fewer cases of typhoid fever were reported than in 1916. As compared with 1916, the death rate from this disease declined 0.3 per 100,000, while there was a decline of 4.9, or 46.7 per cent, as compared with the five-year period, 1911–1915.

The number of deaths from pneumonia following measles reported of late in military encampments has drawn popular attention to the seriousness of measles, a disease which can be combatted only through prompt and well-directed efforts. While there has been a decline in the number of cases reported and in the death rate, as compared with 1916 and with the preceding five-year period, it is felt that there is urgent need of more aggressive efforts to control this disease.

Compared with the same five-year period, scarlet fever shows a decline in death rate of 5.5, or 68.9 per cent, and diphtheria of 2.4, or 12.6 per cent. Poliomyelitis (infantile paralysis) shows a decline of .3, or 25 per cent over this period, but one of 32.5 per 100,000 over 1916. Whooping cough shows a slight decline in the number of cases reported, but a small increase in the death rate, which suggests the probability of unreported cases which should enter into the computation. Epidemic cerebrospinal meningitis shows an increased number of reported cases and deaths as compared with 1916, but a decrease as compared with the preceding five years. This disease is one peculiarly prevalent in military camps.

During the year there has been a slight increase in the number of cases of bacillary dysentery recorded, accounted for by stimulation of reporting, resulting from an intensive investigation of outbreaks in several municipalities.

The prevalence of smallpox, chiefly in two large and several small outbreaks, has drawn attention again to the danger of neglecting general vaccination. These outbreaks have been controlled through united and vigorous efforts on the part of State and local health officials to encourage vaccination and to locate and quarantine or vaccinate all exposed persons. During the year 316 cases of smallpox were reported. As usual the number of cases occurring among successfully vaccinated persons has been

negligible. Realizing that opposition to vaccination has largely resulted from careless and unscientific methods, a definite procedure has been recommended, and physicians urged not only to adhere to it closely, but to maintain proper care and supervision of vaccinated persons.

During the year several of the Department's communicable disease circulars have been revised, and a new circular prepared upon epidemic cerebrospinal meningitis. Syphilis, chancroid and gonorrhea are now included in the list of officially recognized communicable diseases, and circulars of instruction regarding these diseases are available for distribution by physicians. Through the inclusion of venereal diseases in the list of those which are communicable, it is now possible for health officers to control dangerous or negligent cases.

Division of Child Hygiene

During the first half of the year, child welfare campaigns were carried on in eighteen different localities, principally in Chautauqua and Niagara counties, where it was felt that the work was most urgently needed. Exhibits illustrating all phases of child welfare work were shown during the year in seventeen municipalities. A trained child welfare nurse was in daily attendance at the exhibits to explain to visitors the nature and purpose of each feature of the work. In conection with the exhibits, talks on child welfare were given daily by Dr. H. L. K. Shaw, Director of the Division, Dr. Edward Clark, then Sanitary Supervisor, or Mr. T. B. Peck, Supervisor of Exhibits.

During the year the so-called "Parcels Post" exhibits, consisting of a series of small panels illustrating child welfare work were placed on exhibition in a number of public libraries in the State. Another means of securing publicity has been through the distribution of child welfare pamphlets, posters, window cards, etc.

In the latter part of July, Dr. Shaw, Director of the Division, was called into military service, and Dr. Edward Clark, of Buffalo, one of the Sanitary Supervisors, was appointed acting director. Shortly after Dr. Clark took over the work the commissioner determined to have a series of food exhibits throughout

the State. These were shown at county fairs and in a large number of cities and towns, the acting director being assigned as one of the lecturers. One hundred and forty-six addresses were given by him at fairs, schools, clubs, boards of trade, etc., in thirty-four different cities and towns. In connection with each lecture on food, a talk was also given by him on some phase of child welfare work. In addition to the above addresses, four talks exclusively on child hygiene, two on poliomyelitis and five on tuberculosis were given.

During 1917 infant welfare stations have been established in Lackawanna, Dunkirk and Niagara Falls. Seventy-one infant welfare stations were in operation in different cities and towns during the whole or part of the year.

Total number of babies reported at stations	56,886
Total attendance at clinics	27,763
Total number of babies examined	9,141
Total number nursing visits	73,196
Total number of stations reporting	43

The work of supervising and organizing Little Mothers' Leagues was kept up during the year, with the result that new leagues were established in eight municipalities. These new leagues have a membership of four hundred and eighty-six. Lantern slide exhibits illustrating various phases of child welfare work were given at thirty-nine different places.

A few years ago the Department established the custom of sending to each mother in the State, as soon as the birth certificate of her baby was received in the Department, a copy of the Department's booklet, "Your Baby. How to Keep it Well." This custom has been continued during the past year, and over 104,000 of these booklets have been sent out.

In addition, approximately 250,000 child welfare leaflets and pamphlets have been distributed throughout the State. During the first week of May, a State Child Welfare day was observed generally, and letters were sent to clergymen, women's clubs, etc., urging them to cooperate in making this day a success.

Letters were sent out to the number of approximately 2,000 in answer to inquiries regarding matters pertaining to the work

of the division. Many of these letters were sent to different States in the Union and to foreign countries, in reply to requests for information as to the work of this division, and for Child Welfare pamphlets and circulars issued by the Department.

The infant mortality statistics for the years 1916 and 1917 are as follows:

Year	*Births*	*Death*	*Infant mortality rate*
1916	103,530	9,912	96.
1917	104,200	9,846	94.

The infant mortality rate for 1917 — 94 — is the lowest in the history of the State. In estimating this rate, New York City, of course, is excluded.

Division of Laboratories and Research

The work of the laboratory during the year 1917 has continued to increase with scarcely any interruption. With the declaration of war and the support of the Adjutant General's special fund for preparatory service, the work was extended in scope and new branches of activity were taken up. Thus the most striking features of the work during 1917 are the phenomenal growth of the diagnostic service, together with the increased distribution of antitoxins, serums, and vaccines, and the expansion of the work for the purpose of meeting emergencies likely to arise in connection with the war situation.

Physicians and health officers demand each year the examination of an increasing number of specimens such as have hitherto been handled by the laboratory and also the examination of specimens of a kind not previously undertaken, thus adding not only to the volume of the work of bacterial diagnosis, but also to the scope. The growth of the Wassermann work has exceeded all expectations. Each year the number of specimens has nearly doubled. Requests have been received for complement fixation diagnosis of tuberculosis, and other laboratories have undertaken the work. An investigation of these methods is now in progress to determine the practicability of this method as a routine procedure.

The distribution of diphtheria and tetanus antitoxins alone has increased 13 per cent, whereas the distribution of serums used in the treatment of pneumonia, meningitis and dysentery has increased 410 per cent.

Considerable progress was made during the summer in improving the methods of preparing pure smallpox vaccine by the method of Noguchi, but owing to the pressure of work and lack of appropriations it was necessary to discontinue it. However, at no time in these investigations were results secured which would warrant the general distribution of the vaccine because it invariably failed to maintain as uniform a degree of potency as the standard calf vaccine.

The laboratory, however, has been exceedingly fortunate in producing antimeningococcus and antipneumococcus serums of high potency. An investigation of many commercial serums sold in the State revealed the fact that many of them lacked potency, and to such an extent that it became necessary to request the recall of these serums from the State. The Public Health Council found it necessary to pass a regulation requiring the serums offered for sale in the State to exceed minimum standards of potency.

The expansion of the work in preparation for emergencies likely to arise in connection with the war situation comprised the organization of a mobile laboratory adapted for service in almost any emergency. This unit was nearly completed when the appropriations for this purpose were exhausted.

Owing to the great difficulty of securing salvarsan and similar products the attempt was made to prepare it in the laboratory. Considerable progress has been made, but there is some question whether it will be possible to complete the last stages with the present laboratory facilities.

To meet any large demands for antitoxins, serums and vaccines immediately after war was declared, the production and reserve supply of these products was enormously increased as far as was possible with present facilities. This was done in order to serve the National Guard and the camps where large numbers of men were to be concentrated. Although no serious outbreaks or epidemics occurred in connection with the mobilization of troops

in camps in this State, serious outbreaks occurred elsewhere, and the War Department exhausted this surplus of serum.

Much of the research activity of the laboratory has been curtailed by the strenuous demands of the war work and the preparations for emergencies. Only such technical problems as promised to improve the methods and yield immediate results have been undertaken.

Time and effort have been given to formulate and bring together the standard methods of procedure in use in the routine work of the laboratory and to have this technique arranged so that changes and improvements may be recorded. It is intended to have all outlines and reports of research and investigation problems, and all scientific papers written by members of the staff kept in the library. They are to be arranged in a special file, with an accompanying index. The library has been fully organized and is the most suitable department to attend to the work. This matter of caring for the scientific literature relating to the laboratory activities and containing in many cases the results of research and investigation has been shown to be very necessary. The laboratory has grown with such rapidity and the demands for further expansion have been so insistent, that the former system of filing has become entirely inadequate for the needs of rapid reference. In fact, at no time in the history of the laboratory has there been a satisfactory record of the procedures that are used in the work.

At the beginning of the year 1914, when the laboratory was first reorganized, the staff numbered 17. During the summer of 1917 a maximum staff of 137 was required to carry on all the work. The laboratory employees has been forced to work under the most discouraging conditions in the laboratory buildings on Yates street and at the farm, but every one is greatly encouraged by the prospect of a new laboratory building and the new stables, both of which are so necessary. Despite the phenomenal growth of the laboratory, the necessity of securing such large increases in the appropriations, and the continual shortage of these appropriations which are no sooner made than exhausted by the growth of the work, it is most gratifying and encouraging to feel that the value of the work is recognized. This has been substantially expressed by the support which Governor Whitman and the Legislature have given.

Division of Sanitary Engineering

To the Engineering Division falls the responsibility of supervising the work of protecting the sanitary quality of public water supplies, the disposal of sewage and wastes from the municipalities and factories of the State, and the carrying out of investigations and measures for control over many activities of a sanitary engineering nature, such as garbage disposal, land drainage, mill and factory nuisances, milk pasteurization, etc.

The volume of work performed by this division has been increasing from year to year since the organization of the division in 1906. The work carried on during 1917 was not only greater in amount than during any preceding year, but more extensive in scope. New lines of effort, particularly the investigation of the sanitary construction and operation of milk pasteurization plants and the inspection of sanitation at military camps, aviation fields and naval bases within the State have been added to the routine and special work usually performed by this division. To meet these increments in the work the engineering force has been increased during 1917 by the addition of one assistant engineer, one engineering draftsman and three inspectors.

A numerical summary of the more important matters which have been disposed of by the Engineering Division during the year 1917 appears in the following table for comparison with the corresponding figures for 1916:

	1916	1917
Letters and other correspondence referred to Engineering Division	3,193	3,217
Communications and reports sent out	4,785	4,853
Plans examined and reported upon	122	125
Investigations of public water supplies	183	130
Investigation of sanitary condition of State institutions	9	25
Investigation of sewage disposal plants	18	15
Investigation of milk pasteurizing plants		148
Investigation relating to sewerage systems	25	16
Conferences held with local officials	287	357
Lectures and addresses by staff	20	12
Investigation of stream pollution and nuisances	56	35

Concerning the routine work of the division, as shown by the foregoing table, it may be noted that sections 76 to 84 of the Public Health Law and various provisions of the Town and Village Law place with this Department the general supervision over the design of works for sewerage and sewage disposal and questions of stream pollution. The sections referred to provide that, unless a permit for such discharge shall have been issued by the State Commissioner of Health, no sewage or manufacturing wastes shall be discharged into any stream. The law also provides that in case of sewage discharge which creates a nuisance or menace to health, the State Commissioner of Health, with the concurrence of the Governor and Attorney-General, may issue an order requiring the discontinuance of such sewage discharge and the construction of proper sewage disposal works. The work carried on under these sections is very important and while not constituting the greater part of the entire work of the division, does embody the bulk of the activities specifically required by statute.

In the prosecution of this work during 1917, specific examinations and reports of 150 plans for sewerage and sewage disposal have been made prior to approval of these plans by the commissioner, and in addition general investigations relating to sewerage and sewage disposal have been conducted in several municipalities.

It is obvious that no branch of the work of the Engineering Division is of greater moment in the protection of public health than the work of investigating and supervising the sanitary quality of the public water supply. Following the policy carried out during recent years, especial attention has been given to this work. Five hundred out of a total of 530 public water supplies in the State have now been investigated. Although the number of new supplies investigated in 1917 was only 30, the prosecution of this work involved reinspection of supplies previously inspected and the total number of supplies thus covered was 130.

The full significance of this work of protecting public water supplies was set forth at length in the last annual report of this Department, where it was stated that in 1908, when these investigations were first undertaken, there existed some 400 public water supplies serving a population of 6,100,000 and only 50 of these supplies, serving a population of approximately 700,000, were receiving any kind of purification treatment.

At the end of 1917 there exists approximately 530 public water supplies serving a population of about 8,200,000, of which supplies some 110 receive purification, serving a population of 6,800,000. This means that during this decade the population protected by water purification has increased from 700,000 to 6,800,000. In this same period the typhoid fever death rate for the State has decreased from 19.0 in 1906 to 5.6 in 1917, and the greatest factor in the reduction of this typhoid fever mortality has been the increased protection afforded by water purification.

Six sets of "Rules and Regulations for the Protection from Contamination of Public Water Supplies" were enacted during the year by the commissioner under the provisions of section 70 of the Public Health Law, these rules having been prepared by the Engineering Division following an inspection of the watersheds to which they related.

Many complaints are received each year at the Department regarding public nuisances and cases of stream pollution. While most of these complaints are referred to local boards of health for suitable action under the powers vested in said boards by the Public Health Law, it is necessary in a large proportion of cases that the complaints be investigated by the Engineering Division, especially where the question of sewerage is involved, where the public nuisance complained of is one of considerable magnitude, or involves plans which require an engineering examination and a report. During the year about 35 investigations of public nuisance and cases of stream pollution were conducted and recommendations for remedial action made to the local boards of health and to the parties responsible for the nuisance.

One of the new lines of routine work taken up during the year has been the investigation of the efficiency of milk pasteurizing plants. This work has involved a detailed inspection and examination of 148 plants in which milk pasteurization is carried on. Subsequently recommendations for improvements in the construction, equipment, and operation of the plants were made in order that the product might meet the requirements of the sanitary code with respect to the bacterial count.

The work of making detailed examinations of the sanitary condition of State institutions was continued in 1917, some 25 institutions being investigated. Reports with recommendations were

transmitted to the institution authorities and to the state boards or commissions having general supervision over them.

The work of inspecting the condition and operation of sewage disposal plants has not been prosecuted to the same extent as in recent years owing to the greater necessity of utilizing the services of the engineers of the division in investigating public water supplies. Some fifteen investigations of the condition of operation and efficiency of operation of sewage disposal plants were made, however, as a result of complaints of nuisance in streams or of faulty operation of these plants and recommendations for changes and improvements in the construction and manner of operating the plants here submitted to the local authorities.

An extensive investigation was carried on during the summer and fall of the alleged emission of smoke, gases, fumes and vapors from chemical and other manufacturing plants on the west side of the Hudson River in the Borough of Edgewater, N. J., with a view to determining whether such fumes were carried across the river to New York. A further hearing is to be held in this matter for a consideration of the conclusions reached during this investigation.

While the table of routine work given above shows in general a marked increase in the volume of office work in practically every branch of the work listed, the table is by no means complete, nor does it include certain important special investigations which have required a considerable amount of time during the year. The table does not include, for example, the inspection of the sanitary condition of military camps, naval bases and airplane stations, and the territory immediately surrounding these camps and stations to which precedence was always given whenever the assistance of the Department was requested by the military authorities for the placing and maintaining of these camps, stations and zones in a sanitary condition. Some fifteen camps, naval bases and aviation stations have been thus investigated. In one instance an extensive sanitary survey was made of a neighboring village and subsequent action was taken by the Department to require certain sanitary improvements to be made.

In addition to regular water supply inspection, referred to above, it has been necessary for this division to assist local authorities in providing safety measures for local water supplies by the

installation of the Department's emergency chlorine apparatus and to assist in such work in eight municipalities. In one case where a considerably increased number of cases of typhoid fever were occurring, it was necessary for extensive detailed supervision to be given by the division to the operation of the chlorine apparatus, in order to sterilize the water supply which was found to be contaminated. This supervision continued over a period of two months pending the introduction of a new water supply and required daily visits to the municipality.

Other special work carried on by the division during the year has consisted in cooperation with the State Architect and State Engineer in determining upon feasible plans for water supply and sewage disposal for state institutions, including those at Wingdale, the Marcy Division of the Utica State Hospital, Kings Park, the Creedmoor Division of the Brooklyn State Hospital and at various other state institutions. This work has also involved numerous conferences with reference to estimates of appropriations needed to carry out the work.

During the year also the services of a temporary inspector employed in the Department were loaned to the Lake George Association for a period of eight weeks during which time a detailed sanitary survey of some 500 properties adjoining and adjacent to the lake were made.

Another special line of work carried on during the year has been in reference to sites for county tuberculosis hospitals. In order to expedite the work of establishing these hospitals in counties having populations of over 35,000, inspections have been carried on by the Engineering Division, under arrangements made for such cooperation, covering 100 possible sites for hospitals in thirteen counties; the work of the Division relating to the provision for adequate water supplies of satisfactory sanitary quality and the question of proper disposal of sewage at the sites under consideration.

Attention is again called to the serious handicapping of the work of the Division on account of the inconsistencies, ambiguities and deficiencies in existing laws which limit the effective work which might be done in improving the sanitary quality of public water supplies and in the removal of stream pollution. Legislation, which has been asked for in the past two sessions of the

legislature, but not passed, is greatly needed to accomplish more effective results in these lines of work. It is expected that bills will be again introduced in the legislature during the present session looking toward a more rational and effective basis of control by the State Department of Health.

Division of Vital Statistics

The improvement of the fundamental data upon which death and birth rates are based is necessary to real progress in the vital statistics field. Such advance is dependent not only upon more comprehensive population statistics, but also upon better and more complete birth and death records. Progress in the latter respect was systematically promoted throughout the year 1917, and studies have been made for improved statistical tables. Birth registration has been given special attention.

Such efforts are an essential preliminary to any experiment in the deduction and transfer of nonresident deaths. On July 1, 1916, a very important beginning was made by the establishment of separate registration districts for certain state institutions and the separate tabulation of their returns. During 1918, this experiment will be extended, if possible, to include all primary districts. If this can be done comprehensively, and without disturbing comparability of future tables with those of former years, the correction will improve the practical value of the rate of various large communities, which are now obscured by reason of many deaths of nonresidents.

The supervision of midwives, including the issuing of midwives' licenses, has been transferred to the Vital Statistics Division during the past year. Systematic steps were taken to bring about the discovery and registration of unlicensed midwives. A beginning was made in the carrying out of a statewide plan for courses of instruction for midwives in the larger communities, by cooperation between the sanitary supervisors, local health officers, and nurses — the detailed field work being conducted by a special nurse from the Division's staff. This method should result during 1918 in marked improvement in the standards of practice among midwives. It will greatly enhance the value of oversight by the state and local health authorities, and practically eliminate the unlicensed midwife.

The Division has regularly pursued a policy of issuing carefully prepared monthly press statements on subjects of practical importance disclosed by the monthly statistical analyses. The value and interest of these have been apparent as shown by the very extensive space allotted by the newspapers. The direct result has been to make the analyses of birth and death return of practical educational value to the public.

Original statistical studies, including a new table for special use in infant mortality work, have been undertaken by the Division's staff, and these will be available for publication during 1918.

Numerous details of the Division's organization and procedure have been improved, which have increased the accuracy of its work and greatly facilitated its service.

Close cooperation and cordial relationship have been promoted between the Division and the many local registrars and deputies which has resulted in good team work and a splendid morale. The Division extends to them its compliments and gratitude for the very efficient manner in which they have cooperated and performed their duties as a group of public health workers.

Mortality review of the year 1917

The year 1917 was marked in New York State by excessive mortalities from a number of important causes, notably by an unusual prevalence of pneumonia during the winter and spring; by a period of excessive heat in midsummer; a decided increase in the number of fatalities from accidental causes; and by a generally increasing mortality from the degenerative conditions of adult life, particularly the diseases of the heart and kidneys.

Despite these excesses, however, the reductions achieved in the more preventable diseases against which public health efforts have in the main been directed — infantile diarrhea, the common infectious diseases, typhoid fever and tuberculosis — have resulted in a general death rate for the State as a whole, during 1917, of 14.6 per 1,000 persons living. This compares favorably with the death rate of 1916 (14.7), and the average for the preceding five-year period (14.9). It is only slightly higher than the 1915 death rate (14.5), which was the lowest in the history of the State.

REPORT OF PUBLIC HEALTH COUNCIL

REPORT OF PUBLIC HEALTH COUNCIL

His Excellency, Charles S. Whitman, *Governor of the State of New York, Albany, New York:*

Sir.— The Public Health Council has the honor to submit its fourth annual report covering its work for the year 1917.

As outlined in the reports heretofore made to you, the Council, immediately upon its formation, proceeded to establish sanitary regulations in the form of a sanitary code with the intention of providing for the State of New York a modern, uniform and scientific system of public health law in more detail than was practicable by direct and occasional enactments by the Legislature. The original code was adopted on April 7, 1915. Since then, from time to time, it has become necessary to adapt the code to changing conditions through amendments; to revise its provisions so as to meet the new requirements of science and experience; and to develop such additional safeguards to the public health as seemed urgent and practicable.

During the past year the situation forced by the great war upon this State, as well as upon the rest of the country and the rest of the civilized world, has largely commanded the attention of the Council. The great cantonments established by the Federal Government in the State of New York gave rise to many pressing public health problems with which we had not hitherto been called upon to deal. The health of the inhabitants of the cantonments while within the same is, of course, subject to the control of the Federal military authorities; but the health of the soldiers within these cantonments, as affected by conditions outside the cantonments proper, presents a condition which is peculiarly within the province of the Public Health Council.

The fact that the Council meets frequently and can thus deal with these suddenly arising emergencies, illustrates the wisdom of the Legislature in providing this machinery for the immediate study of new conditions and problems and the establishment of fitting and effective regulations to meet them.

The Council provided for the establishment by the State Commissioner of Health of cantonment zones in the neighborhood of

the great military cantonments of the State and also provided that in these zones no articles of food should be sold or offered for sale except by licensed dealers, it further provided that no person should be licensed unless the local health officer had issued a permit to him which could only be issued after an inspection of the plant which disclosed that sales were conducted under sanitary conditions. This permit may be revoked at any time for cause either by the local health officer or the State Commissioner of Health.

The question of the standardization of antipneumococcus and antimeningococcus serums became especially acute in view of the vast concentration of men within the State of New York. The Council immediately proceeded to provide for the standardization of these serums so that our soldiers, as well as the public at large, would be assured of serums of standard potency and not, as has often been the case, be treated with serums entirely worthless.

The conditions of life in the camps during the Winter conduce to the rapid spread of pneumonia and for this reason the Council amended the sanitary code declaring pneumonia a reportable disease, to the end that its control might be more speedy and effective.

As has been evidenced by many of the reports of the Federal authorities, the question of venereal diseases has become acute. The Council therefore has indicated in the code that venereal diseases are communicable diseases and has formulated certain methods tending towards their control and the education of the public in reference thereto.

The amendments to the code already touched upon cover the work of the Council undertaken with a view of meeting war conditions, although some of them, of course, would be important even in normal times. Other amendments to the code which have been adopted and which have no direct connection with the war were the revision of its provisions in reference to certified milk, so as to provide for a greater certainty of the purity of the same; the provisions for the inspection of children's boarding houses and of boarding houses taking tuberculous patients; the immediate reporting to health officers by local registrars of deaths from communicable diseases; and the reporting of persons bitten by

dogs supposed to be rabid. Many minor changes were also made with reference to poliomyelitis as a result of experience gained during the great epidemic of that disease in 1916. In addition to this the Council has amended the code by varying slightly the qualifications for midwives.

Despite the adoption of the sanitary code throughout the State of New York, it became obvious during the poliomyelitis epidemic of 1916 that there existed throughout the State a deplorable confusion and uncertainty with reference to local health ordinances. No two local boards of health in the State had similar ordinances and in many cases the provisions of the ordinances of a village were in conflict with the provisions of the ordinances of the town. While it is impossible to say that the public health in this epidemic directly suffered by reason of this conflict and confusion, it is easily conceivable that it might. These considerations led the Council during the past year to prepare a set of model regulations which they recommended for adoption by all of the local health boards of the State outside of cities of the first and second class. Up to December 31, 1917, although the model regulations were not sent out until sometime in November, approximately one-third of all the local health boards in the State had adopted them. It is felt that a great step in advance will have been taken when there exists throughout the State uniformity of local health regulations, these, in turn, being consistent with and complementary to the provisions of the sanitary code.

This prompt adoption of the model sanitary code by so many of the more alert and intelligent communities, and the fact that in several instances two or more small communities in the State have united in the selection and support of a local health officer, thus securing more effective service than has hitherto seemed practicable, are some of the most encouraging features of the advance made during the year.

Pursuant to the provisions of the Public Health Law the Council has fixed the qualifications of the Sanitary Supervisors of the State Department of Health as follows:

1. They shall be physicians.
2. They shall, when appointed, be not less than twenty-eight nor more than fifty years of age.

3. They shall either (a) have served as a health officer of a city, town or village having a population of not less than 5,000 persons for a period of at least four years; or (b) shall have received instruction approved by the Public Health Council, or a duly authorized committee thereof, in sanitary science, including five hours' instruction per week during the school year, in an educational institution, and shall have had at least two years' experience in public health work; or (c) shall have received a degree, certificate or diploma in public health granted after the completion of a course approved by the Public Health Council, in an educational institution, at least one year's practical experience in public health work; or (d) shall have submitted proof satisfactory to the Public Health Council, or a duly authorized committee thereof, that they have actually engaged in public health work of such a character as shall qualify them for the duties of the position.

In addition to these qualifications the Council recommended the following:

1. They shall not be allowed to engage in the regular practice of medicine or in any other regular occupation or business which will interfere with the full discharge of their duties.

2. The salaries of sanitary supervisors shall be $3000 per annum.

3. The examination shall consist of (a) a written examination pertaining to the duties of the position, with a weight of 2; and (b) an oral examination at which the candidate will probably be required to appear for an interview, in order to determine his experience and personal qualifications, with a weight of 3.

In a previous report the Council has called to the attention of your Excellency the great importance of the local health officer in the far-reaching and promising movement now under way to secure to all citizens of the State — in the country as well as in the cities — the larger measure of health and the prolongation of

life which modern science has made possible. The citizens of the State can secure these benefits, however, only when the local health officer is so well informed of the later achievements of science, so well acquainted with the new methods for the recognition, treatment and prevention of disease, and so intelligently devoted to the interests of his constituents, that he can and will make available for them all the resources for the public welfare which the New York State Department of Health now affords. Most of the medical schools are so lax in affording such knowledge and training as the modern health officer requires, that the Council found it necessary three years ago, in endeavoring to fix a standard of qualifications for local health officers, to appeal to various colleges and schools of the State to establish special courses for the instruction of present and prospective health officers. The response to this appeal from most of these institutions has been appreciative, generous, and helpful. The gratitude of the citizens of the State of New York is due to all those who have so unselfishly devoted time and energy to this significant public service.

Although the times have been unpropitious for these extra activities, often involving considerable absences from their homes and regular professional activities, and sometimes notable personal expense, many present and prospective health officers have availed themselves of the privileges thus secured and have taken the special courses.

The Council has heretofore adopted qualifications for the local health officers of the State, but owing to many complex conditions and in order to allow the various health officers ample time for the completion of their courses, the time when these qualifications were to go into effect was made June 1, 1917, instead of November 1, 1916.

In many cases the health officers entered the military service of the United States immediately upon the declaration of the war. This at times left a health district without any qualified physician to attend to the duties of health officer. The Council therefore resolved that in case a man was appointed as a temporary health officer, pending the return of a health officer who had entered military service, but who had not resigned, the official

qualifications might be waived. In addition to this, the Council has acted upon applications for exemption from qualifications of seventy-two health officers in the State of New York.

The Council approved legislation requiring a sworn statement in applications for marriage licenses that neither of the parties had been infected with a venereal disease within five years next preceding the application, or if so infected had had a laboratory test showing that they had been cured. The Council further approved legislation providing for deputy health officers; changing the qualifications of health officers of second class cities; providing for the pasteurization of skimmed milk and whey used as food for calves; and for the licensing of laboratories.

Appended hereto and marked appendix "A" are the amendments to the Sanitary Code adopted by the Council during the year.

Also appended and marked appendix " B " is the model sanitary code recommended for adoption by the local health districts.

All of which is respectfully submitted.

HERMANN M. BIGGS
SIMON FLEXNER
ELLA L. BLAIR
T. MITCHELL PRUDDEN
HENRY N. OGDEN
WILHELM GAERTNER

MARCH 5, 1918.

APPENDIX A

The Sanitary Code of the State of New York was amended by adding thereto a new chapter, to be known as chapter VIII, and to read as follows:

Chapter VIII

Boarding Houses

Regulation 1. No license shall be issued by the board of health of any city or town under the provisions of section four hundred eighty-two of the penal law to any person to receive, board or keep any nursing children or any children under the age of twelve years not his relatives, apprentices, pupils or wards, without legal commitment, unless the health officer or person performing the duties of health officer of such city or town shall have made an inspection of the premises proposed to be occupied by such children, and shall have filed a written report thereon with the local board of health. Such inspection shall include an examination of each room proposed to be occupied by such child or children, and of the sanitary condition of the premises.

Regulation 2. No license shall be issued to any person to receive, board or keep any child or children unless each such child shall sleep in a room having one or more windows opening into the outer air. Provision must be made for the free entrance of fresh air into every such sleeping room and every such room shall be aired at least once in each twenty-four hours.

Regulation 3. Every such license issued by the board of health of any city or town shall be on a form to be prescribed by the state commissioner of health. Every such license shall expire on the thirty-first day of May after its issue, and may be renewed after a reinspection of the premises by the local health officer and a written report thereon to the local board of health. Any such license may be revoked at any time by the state commissioner of health or by the board of health issuing the same.

Regulation 4. It shall be the duty of every health officer to inspect in the municipality under his jurisdiction every boarding house or lodging house where a person or persons affected with tuberculosis may be boarded or lodged and it shall be his duty to see that the requirements of the public health law and the sanitary code are complied with.

Regulation 5. It shall be the duty of every local health officer to furnish the proprietor or other person in charge of such boarding house or lodging house with such sections of the sanitary code and the public health law as may be required by the state commissioner of health.

Regulation 6. It shall be the duty of the proprietor or other person in charge of any boarding or lodging house in which a person or persons affected with tuberculosis may be boarded or lodged to post in a conspicuous place such provisions of the sanitary code and public health law as may be required by the state commissioner of health.

Regulations 1, 2 and 3 took effect on March 1, 1917, and regulations 4, 5 and 6 on June 1, 1917.

Regulations 13 and 14 of chapter III of said code were amended to read as follows:

Regulation 13. Designations of milk and cream restricted. All milk sold and offered for sale at retail shall bear one of the designations provided in this regulation, which constitutes the minimum requirements permitted in this state.

No term shall be used to designate the grade or quality of milk or cream which is sold or offered for sale, except

"Certified"
"Grade A raw"
"Grade A pasteurized"
"Grade B raw"
"Grade B pasteurized"
"Grade C raw"
"Grade C pasteurized"

Certified. No milk or cream shall be sold or offered for sale as "Certified" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

All cows producing such milk or cream must have been tested at least once during the previous year with tuberculin, and any cow reacting thereto must have been promptly excluded from the herd. The reports of such tuberculin tests must be filed with the local health officer and the milk

commission of the County Medical Society in the municipality and county respectively in which such milk is delivered to the consumer.

Such milk must not at any time previous to delivery to the consumer contain more than 10,000 bacteria per cubic centimeter and such cream not more than 50,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health, not less than thirty-five per cent for equipment and not less than fifty-five per cent for methods.

Such milk and cream must be delivered within thirty-six hours of the time of milking.

Such milk and cream must be delivered to consumers only in containers filled at the dairy or central bottling plant.

The caps must contain the word "certified" and bear the certification of a milk commission appointed by the County Medical Society organized under and chartered by the Medical Society of the State of New York, and must also contain the name and address of the dairy as well as the date of milking.

Every employee before entering upon the performance of his duties shall be examined by a duly licensed physician and the reports of such examination shall be sent to the milk commission certifying the milk from such dairy.

The milkers and all persons handling the milk must be provided with suits and caps of washable material which shall be worn while milking or handling the milk and shall not be worn at other times. When not in use these garments must be kept in a clean place free from dust. Not less than two clean suits and caps must be furnished weekly. The hands of the milkers must be washed with soap and hot water, and well dried with a clean towel, before milking.

Grade A raw. No milk or cream shall be sold or offered for sale as "Grade A raw" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

All cows producing such milk or cream must have been tested at least once during the previous year with tuberculin; and any cow reacting thereto must have been promptly excluded from the herd.

Such milk must not at any time previous to delivery to the consumer contain more than 60,000 bacteria per cubic centimeter, and such cream not more than 300,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than twenty-five per cent for equipment, and not less than fifty per cent for methods.

Such milk and cream must be delivered within thirty-six hours from the time of milking, unless a shorter time shall be prescribed by the local health authorities.

Such milk and cream must be delivered to consumers only in containers sealed at the dairy or a bottling plant. The caps or tags must be white and contain the term "Grade A raw" in large black type, and the name and address of the dealer.

Grade A pasteurized. No milk or cream shall be sold or offered for sale as "Grade A pasteurized" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

All cows producing such milk or cream must be healthy as disclosed by an annual physical examination.

Such milk or cream before pasteurization must not contain more than 200,000 bacteria per cubic centimeter.

Such milk must not at any time after pasteurization and previous to delivery to the consumer contain more than 30,000 bacteria per cubic centimeter, and such cream not more than 150,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than twenty-five per cent for equipment and not less than forty-three per cent for methods.

Such milk and cream must be delivered within thirty-six hours after pasteurization, unless a shorter time shall be prescribed by the local health authorities.

Such milk and cream must be delivered to consumers only in containers sealed at the dairy or at a bottling plant. The caps or tags must be white and contain the term "Grade A pasteurized" in large black type.

Grade B raw. No milk or cream shall be sold or offered for sale as "Grade B raw" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

All cows producing such milk or cream must be healthy as disclosed by an annual physical examination.

Such milk must not at any time previous to delivery to the consumer contain more than 200,000 bacteria per cubic centimeter, and such cream not more than 750,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than twenty-three per cent for equipment and not less than thirty-seven per cent for methods.

Such milk and cream must be delivered within thirty-six hours from the time of milking, unless a shorter time shall be prescribed by the local health authorities.

The caps or tags on the containers must be white and contain the term "Grade B raw" in large, bright green type, and the name of the dealer.

Grade B pasteurized. No milk or cream shall be sold or offered for sale as "Grade B pasteurized" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

All cows producing such milk or cream must be healthy as disclosed by an annual physical examination.

Such milk or cream before pasteurization must not contain more than 1,500,000 bacteria per cubic centimeter.

Such milk must not at any time after pasteurization and previous to delivery to the consumer contain more than 100,000 bacteria per cubic centimeter, and such cream not more than 500,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than twenty per cent for equipment and not less than thirty-five per cent for methods.

Such milk must be delivered within thirty-six hours, and such cream within forty-eight hours after pasteurization, unless a shorter time is prescribed by the local health authorities.

The caps or tags on the containers must be white and contain the term "Grade B pasteurized" in large, bright green type, and the name of the dealer.

The provisions of this subdivision shall take effect throughout the state of New York, except in the city of New York, on the first day of January, 1916.

Grade C raw. No milk or cream shall be sold or offered for sale as "Grade C raw" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than forty per cent.

Such milk and cream must be delivered within forty-eight hours from the time of milking, unless a shorter time shall be prescribed by the local health authorities.

The caps or tags affixed to the containers must be white and contain the term "Grade C raw" in large red type.

Grade C pasteurized. No milk or cream shall be sold or offered for sale as "Grade C pasteurized" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than forty per cent.

Such milk and cream must be delivered within forty-eight hours after pasteurization, unless a shorter time shall be prescribed by the local health authorities.

The caps or tags affixed to the containers must be white and contain the term "Grade C pasteurized" in large red type.

The bacterial count herein required shall be made only at county or municipal laboratories or such other laboratories as may be approved by the state commissioner of health.

In those municipalities where a bacterial count of the milk is in the opinion of the local health authorities, impracticable, they may in their discretion grade milk and cream according to the score of the dairies producing it, as prescribed in this regulation, but no such milk shall be designated "Certified," "Grade A raw," or "Grade A pasteurized."

This regulation shall not be constructed to rescind or modify any existing local regulation or ordinance controlling the grading of milk or cream established prior to the first day of September, 1914.

Regulaton 14. Supplementary regulations by local authorities. The health authorities of any municipality may in their discretion increase the stringency of these regulations or add to them in any way not inconsistent with the provisions thereof, and may prohibit the sale or the keeping for sale, within the municipality of any of the grades of milk herein defined.

The amendment to regulation thirteen took effect May 1, 1917, and the amendment to regulation fourteen on July 14, 1917.

Subdivision 1 of regulation 1 of chapter I was amended to read as follows:

(1) The term "communicable disease" means such communicable disease as may be designated in regulation 1 of chapter II of the code, except that no regulation of this code shall apply to or include chancroid, gonorrhoea or syphilis unless such disease is specifically mentioned in such regulation.

Regulations 1, 8, 12, 13, 14, 22, 32, 34, 35, 36, 27, 38 and 29 of chapter two were amended and four new regulations known as 2-a, 29-a, 29-b and 42-b, were added, as follows:

Regulation 1. Communicable diseases designated. For the purpose of this code, the term communicable disease shall be held to include the following diseases, which are hereby declared to be communicable through the conveyance of infective organisms:

Anthrax
Chancroid
Chickenpox
Cholera, Asiatic
Diphtheria (membranous croup)
Dysentery, amoebic and bacillary
Epidemic or cerebrospinal meningitis
Epidemic or streptococcus (septic) sore throat
German measles
Glanders
Gonorrhoea
Measles
Mumps
Ophthalmia neonatorum (suppurative conjunctivitis of the newborn)
Para-typhoid fever
Plague
Pneumonia
    a. Acute lobar
    b. Bronchial or lobular
Poliomyelitis, acute anterior (infantile paralysis)
Puerperal septicaemia
Rabies
Scarlet fever
Syphilis
Smallpox
Trachoma
Tuberculosis
Typhoid fever
Typhus fever
Whooping cough

This regulation as amended took effect January 2, 1918.

Regulation 2-a. Reporting cases of persons bitten by a rabid animal. It shall be the duty of every physician or other person to report to the local health officer within whose jurisdiction such person is, the full name, age and address of every person who has been bitten (a) by a rabid animal, (b) by an animal suspected of being rabid, within twenty-four hours from the time when such fact comes to his knowledge.

It shall be the duty of the health officer to transmit promptly these reports to the state department of health.

Regulation 8. Reporting cases of communicable disease on dairy farms by physicians. When a case of Asiatic cholera, diphtheria, amoebic or bacillary dysentery, epidemic cerebrospinal meningitis, epidemic or septic sore throat, para-typhoid fever, poliomyelitis, acute anterior, scarlet fever, smallpox or typhoid fever exists on any farm or dairy producing milk, cream, butter, or other dairy products for sale, it shall be the duty of the physician in attendance to report immediately to the local health officer the existence on such farm or dairy of such case.

It shall be the duty of the health officer to report immediately to the state commissioner of health, by telephone or telegram, the existence on such farm or dairy of such case, together with all facts as to the isolation of such case, and giving the names of the localities to which such dairy products are delivered.

This regulation as amended shall take effect throughout the State of New York, except in the city of New York, on June 1, 1917.

Regulation 12. Adults not to be quarantined in certain cases. When a person affected with a communicable disease is properly isolated on the premises, except in cases of smallpox, adult members of the family or household, who do not come in contact with the patient or with his secretions or excretions, unless forbidden by the health officer, may continue their usual vocations, provided such vocations do not bring them in close contact with children, nor require that they handle food or food products intended for sale.

Regulation 13. Removal of cases of communicable disease. After isolation by the local health officer no person, without permission from him, shall carry, remove or cause or permit to be

carried or removed from any room, building, or vessel any person affected with diphtheria, scarlet fever, smallpox or typhus fever.

Without permission from the local health officer no person shall carry, remove, or cause or permit to be carried or removed from or to any hotel, boarding house, lodging house, or other dwelling, any person affected with chickenpox, diphtheria, epidemic cerebrospinal meningitis, epidemic or septic sore throat, measles, mumps, poliomyelitis (infantile paralysis), scarlet fever, smallpox, typhus fever, or whooping cough.

Without permission from the local health officer no master of any vessel or other person shall remove or aid in removing, or permit the removal, from any such vessel to the shore, of any person affected with any communicable disease.

This regulation shall not apply to any vessel within the jurisdiction of the health officer of the port of New York.

Regulations 2-a, 8, 12 and 13 took effect June 1, 1917.

Regulation 14. Removal of articles contaminated with infective material. Without instruction from the health officer no person shall carry, remove or cause or permit to be carried or removed from any room, building, or vessel, any article which has been subject to contamination with infective material through contact with any person or with the secretions of any persons affected with Asiatic cholera, diphtheria, scarlet fever, smallpox, typhoid fever or typhus fever, until such article has been disinfected according to the special rules and regulations of the state department of health.

Without permission of the health officer no master of any vessel or other person shall remove or aid in removing or permit the removal from any such vessel to the shore of any article which has been subject to contamination with infective material through contact with any person or with the secretions of any person affected with Asiatic cholera, diphtheria, scarlet fever, smallpox, typhoid fever, or typhus fever.

This regulation shall not apply to any vessel within the jurisdiction of the health officer of the port of New York.

Regulation 22. Preventing the spread of communicable diseases in institutions. It shall be the duty of the superintendent or person in charge of any hospital, or other institution, or dis-

pensary, in which there is a person affected with any communicable disease, to take such steps as will, so far as practicable, prevent the spread of infection and trace its original source.

Regulations 14 and 22 as amended took effect July 14, 1917.

Regulation 29-a. Chancroid, gonorrhoea and syphilis. Chancroid, gonorrhoea and syphilis are hereby declared to be infectious and communicable diseases highly dangerous to the public health.

It shall be the duty of every physician when first attending a person affected with chancroid, gonorrhoea or syphilis to furnish to said person a circular of information issued or approved by the state commissioner of health and to instruct such person as to the precautions to be taken in order to prevent the communication of the disease to others.

This regulation took effect June 1, 1917.

Regulation 29-b. Records of venereal diseases not to be divulged. The records of the State Department of Health, or of any local department or local officer, in reference to cases of chancroid, gonorrhoea and syphilis, shall not be divulged or made public so as to disclose the identity of the persons to whom they relate by any person, except insofar as may be authorized by the public health council.

Regulation 32. Removal to hospital or isolation and restriction of visiting in certain cases. It shall be the duty of the health officer to remove, or cause to be removed, every case of diphtheria, measles, scarlet fever, or poliomyelitis, acute anterior (infantile paralysis) promptly to a suitable hospital, or to see that such case is properly isolated. Such isolation shall be maintained until its discontinuance is permitted by the health officer.

No person, except the physician and the nurse or other person in attendance, shall be permitted to come in contact with or to visit a case of diphtheria, measles, scarlet fever, or poliomyelitis, acute anterior (infantile paralysis), except by permission of the health officer.

Regulation 34. Quarantine in certain emergencies. When any case of diphtheria, epidemic cerebrospinal meningitis, measles, scarlet fever, smallpox, poliomyelitis, acute anterior (infantile paralysis), or typhus fever is not or cannot be properly isolated on the premises and cannot be removed to a suitable hospital, it

shall be the duty of the local health officer to forbid any member of the household from leaving the premises, except under such conditions as he may specify and except as provided by regulation twelve of this chapter.

Regulation 35. Maximum period of incubation. For the purpose of this code, the maximum period of incubation (that is, between the date of the exposure to disease and the date of its development), of the following communicable diseases is hereby declared to be as follows:

Chickenpox	21 days
Measles	14 days
Mumps	21 days
Poliomyelitis, acute anterior (infantile paralysis)	14 days
Scarlet fever	7 days
Smallpox	20 days
Whooping cough	14 days

Regulation 36. Minimum period of isolation. The minimum period of isolation, within the meaning of this code, shall be as follows:

Chickenpox, until twelve days after the appearance of the eruption and until the crusts have fallen and the scars are completely healed.

Diphtheria (membranous croup), until two successive negative cultures have been obtained from the nose and throat at intervals of not less than twenty-four hours, the first of such cultures being taken not less than nine days from the day of the onset of the disease.

Measles, until seven days after the appearance of the rash and until all discharges from the nose, ears and throat have disappeared and until the cough has ceased.

Mumps, until two weeks after the appearance of the disease and one week after the disappearance of the swelling.

Poliomyelitis, acute anterior (infantile paralysis), until three weeks from the day of the onset of the disease.

Scarlet fever, until thirty days after the development of the disease and until all discharges from the nose, ears and throat, or suppurating glands have ceased.

Smallpox, until fourteen days after the development of the disease and until scabs have all separated and the scars completely healed.

Whooping cough, until eight weeks after the development of the disease or until one week after the last characteristic cough.

Regulation 37. Sale of foods forbidden in certain cases. When a case of diphtheria, epidemic or septic sore throat, amoebic or bacillary dysentery, epidemic cerebrospinal meningitis, scarlet fever, smallpox, poliomyelitis, acute anterior (infantile paralysis), or typhoid fever exists on any farm or dairy producing milk, cream, butter, cheese, or other foods likely to be consumed raw, no such foods shall be sold or delivered from such farm or dairy, except under the following conditions:

(a) That such foods are not brought into the house where such case exists;

(b) That all persons coming in contact with such foods eat, sleep and work wholly outside such house;

(c) That such persons do not come in contact in any way with such house or its inmates or contents;

(d) That said inmates are properly isolated and separated from all other parts of said farm or dairy, and efficiently cared for; and

(e) That a permit be issued by the health officer.

Regulation 38. Destruction of foods in certain cases. When a case of diphtheria, epidemic or septic sore throat, amoebic or bacillary dysentery, epidemic cerebrospinal meningitis, scarlet fever, smallpox, poliomyelitis, acute anterior (infantile paralysis), typhoid fever exists on any farm or dairy producing milk, cream, butter, cheese, or other foods likely to be consumed raw, the state commissioner of health or the local health officer may destroy or order the destruction of any such foods which in his opinion may have been so contaminated as to be a source of danger.

Regulation 39. Handling of food forbidden in certain cases. No person affected with any communicable disease shall handle food or food products intended for sale, which are likely to be consumed raw or liable to convey infective material.

No person who resides, boards, or lodges in a household where he comes in contact with any person affected with bacillary

dysentery, diphtheria, epidemic or septic sore throat, measles, scarlet fever, poliomyelitis, acute anterior (infantile paralysis), or typhoid fever, shall handle food or food products intended for sale.

No waiter, waitress, cook, or other employee of a boarding house, hotel, restaurant, or other place where food is served, who is affected with any communicable disease, shall prepare, serve, or handle food for others in any manner whatsoever.

No waiter, waitress, cook, or other employee of a boarding house, hotel, restaurant, or other place where food is served, who lodges or visits in a household where he comes in contact with any person affected with bacillary dysentery, diphtheria, epidemic or septic sore throat, measles, scarlet fever, poliomyelitis, acute anterior (infantile paralysis), or typhoid fever, shall prepare, serve or handle food for others in any manner whatsoever.

Regulations 29-b, 32, 34, 35, 36, 37, 38 and 39 took effect June 1, 1917.

Regulation 42-b. Duties of registrars and health officers when deaths from communicable diseases are reported. 1. It shall be the duty of the local registrar of vital statistics whenever a certificate of death from a communicable disease has been filed with him to immediately report to the health officer the name, age and address of the deceased, together with the disease, and the name of the physician who has filed such certificate.

2. It shall be the duty of every health officer upon receiving such notice to ascertain immediately whether such person has been reported during life with such communicable disease.

3. It shall be the duty of every health officer if he ascertains that a physician has failed to report a case of communicable disease, to inform the physician of his failure to conform with the sanitary code, and to report to the state department of health the name of every physician failing to report cases of communicable disease.

This regulation took effect June 1, 1917.

Chapter VII was amended, by adding thereto four new sections, to be known as regulations 10, 11, 12 and 13, and to read as follows:

Regulation 10. Declaration of cantonment zones. The state

commissioner of health may from time to time declare such territory as he deems necessary in the neighborhood of a military or naval camp or cantonment a health zone, and he may from time to time change the limits of or abolish such zone.

Regulation 11. Permits required to sell food and beverages in all health zones. Whenever the state commissioner of health has declared any territory to be a health zone, as provided for in regulation ten of this chapter, thereafter and so long as such declaration remains in effect no person shall establish or maintain any place for the sale of food or drink intended for human consumption, unless such person shall first have secured from the health officer, in whose jurisdiction the place is situated, a written permit so to do. Such permit shall not be issued unless, after an inspection, the health officer has satisfied himself that the place is maintained under sanitary conditions. Such permit, unless revoked, shall be granted for one year from the date of its issuance and shall be conspicuously displayed in the place for which it was issued. Such permits are not transferable.

Regulation 12. Monthly inspections by health officers. All places for which such permits are issued shall be inspected at least once in each month by the health officer.

Regulation 13. Revocation of permit. Any permit so issued may be revoked for cause either by the local health officer of the state commissioner of health, after giving the person holding the permit an opportunity for a hearing.

Regulation 10, 11, 12 and 13 took effect November 5, 1917.

Regulations 5 and 8 of chapter IV were amended to read as follows:

Regulation 5. Qualifications required for applicant for license on and after the first day of January, 1915. On and after the first day of January, 1915, every applicant for a license to practice midwifery must possess the following qualifications:

(a) Be not less than twenty-one years of age;

(b) Be able to read and write, provided that in cases of persons of foreign birth who have extended experience or in other exceptional circumstances this requirement may be waived by the public health council;

(c) Be clean and constantly show evidence, in general appearance of habits of cleanliness;

(d) Either—

(1) possess a diploma from a recognized school for midwifes; or

(2) have attended, under the instruction of a duly licensed and registered physician, not less than fifteen cases of labor and have had the care of at least fifteen mothers and newborn infants during lying-in periods of at least ten days each, and shall present a written statement from said physician or physicians that she has received such instruction in said fifteen cases with the name, date and address of each case, and that she is reasonably skillful and competent; or

(3) present other evidence satisfactory to the state commissioner of health of her qualifications, and

(e) Present evidence satisfactory to the state commissioner of health of good moral character, vouched for by at least two reputable citizens.

Regulation 8. Unless revoked, every license to practice midwifery issued by the commissioner of health on or after the first day of January, 1918 shall permit the holder thereof to practice midwifery only during the current calendar year in which such license is issued.

Regulation 5 as amended took effect January 2, 1918 and regulation 8 on December 1, 1917.

The sanitary code was further amended by adding a new chapter IX which reads as follows:

CHAPTER IX

Regulation 1. Sale of antipneumococcus and antimengococcus serum regulated. No serum for the treatment of pneumonia or of meningitis shall be sold or offered for sale in the state of New York unless each package is accompanied by a label or circular on which is stated the potency of the serum as tested by the methods established by the rules and regulations of the state commissioner of health; and no such serum shall be sold or offered for sale the potency of which does not equal or exceed the minimum fixed in such rules or regulations.

This regulation takes effect February 15, 1918.

APPENDIX B
Municipal Sanitary Code

CHAPTER I
Definitions and General Provisions

Regulation 1. Definitions. Unless otherwise specifically provided herein, the following words and terms used in these regulations are defined for the purposes hereof as follows:

(1) The term "communicable disease" means such communicable disease as may be designated in regulation one of chapter two of the sanitary code of the state or in regulation one of chapter three of these regulations. Provided, however, that none of these regulations shall apply to or include chancroid, gonorrhoea or syphilis unless such disease is specifically mentioned in such regulation.

(2) The term "municipality" means and includes a city, town, village or consolidated health district.

(3) The term "board of health" or "local board of health" means and includes the board of health of the*

(4) The term "sanitary code" means the sanitary code of the state of New York adopted by the public health council pursuant to law.

Regulation 2. Construction of regulations. Nothing herein contained shall be deemed to limit or abridge the power conferred upon this board to make other orders and regulations, either general or particular, so long as such orders and regulations do not conflict with the provisions of any law or the provisions of the sanitary code, but if such orders and regulations, hereafter enacted, conflict with or are inconsistent with the provisions of these regulations they shall be deemed, insofar as necessary, to supersede these regulations.

Regulation 3. Penalty for violations. Every violation of, or failure to comply with, any of the provisions of these regulations shall be punishable by a penalty not to exceed one hundred dollars for a single such violation or failure. This penalty shall be deemed to be in addition to any other penalty or punishment provided for by law or by the provisions of the sanitary code.

* Name of municipality to be inserted.

CHAPTER II

Health Officer

Regulation 1. Appointment and qualifications of health officer. The health officer shall be appointed by this board as provided for by law. No person shall be appointed health officer unless he has the qualifications prescribed by the public health council, or unless he has been duly exempted from such qualifications by the public health council.

Regulation 2. Powers and duties of health officer. The health officer shall be the executive officer of this board. He shall have all the powers conferred upon health officers by the public health law, or other law or laws of the state, and by the sanitary code. He shall execute and comply with all of the provisions of law, of the sanitary code and of these regulations. He shall further execute and comply with all orders of this board and of the state department of health.

CHAPTER III

Communicable Diseases

Regulation 1. Communicable diseases designated. For the purpose of this code, the term communicable disease shall be held to include the following diseases, which are hereby declared to be communicable through the conveyance of the infective organisms:

Anthrax
Chancroid
Chickenpox
Cholera, Asiatic
Diphtheria (membranous croup)
Dysentery, amoebic and bacillary
Epidemic or cerebrospinal meningitis
Epidemic or streptococcus (septic) sore throat
German measles
Glanders
Gonorrhoea
Measles
Mumps
Ophthalmia neonatorum (suppurative conjunctivitis of the newborn)

Para-typhoid fever
Plague
Poliomyelitis, acute anterior (infantile paralysis)
Puerperal septicaemia
Rabies
Scarlet fever
Syphilis
Smallpox
Trachoma
Tuberculosis
Typhoid fever
Typhus fever
Whooping cough

Regulation 2. Reporting cases of communicable disease by physicians. It shall be the duty of every physician to report to the health officer the full name, age and address of every person affected with a communicable disease, together with the name of the disease, within twenty-four hours from the time when the case is first seen by him. Such report shall be by telephone or telegram, when practicable, and shall also be made in writing.

Regulation 2-a. Reporting cases of persons bitten by a rabid animal. It shall be the duty of every physician or other person to report to the health officer the full name, age and address of every person who has been bitten (a) by a rabid animal, (b) by an animal suspected of being rabid, within twenty-four hours from the time when such fact comes to his knowledge.

It shall be the duty of the health officer to transmit promptly these reports to the state department of health.

Regulation 3. Reporting cases of disease presumably communicable in schools. When no physician is in attendance, it shall be the duty of every teacher to report forthwith to the principal or person in charge of the school all facts relating to the illness and physical condition of any child in such school who appears to be affected with a disease presumably communicable. It shall be the duty of the principal or person in charge of every school to report forthwith to the health officer all facts relating to the illness and physical condition of any child attending such school, who appears to be affected with any disease presumably

communicable, together with the name, age, and address of such child. Such child shall be at once sent home or isolated.

Regulation 4. Reporting cases of disease presumably communicable in private households, hotels, boarding and lodging houses. When no physician is in attendance, it shall be the duty of the head of a private household or the proprietor or keeper of any hotel, boarding house, or lodging house, to report forthwith to the health officer all facts relating to the illness and physical condition of any person in any private household, hotel, boarding house or lodging house under his charge, who appears to be affected with any disease presumably communicable, together with the name of such person.

Regulation 5. Reporting cases of disease presumably communicable by nurses and persons in charge of camps. It shall be the duty of every visiting nurse and public health nurse and of the person in charge of any labor or other camp, having knowledge of any person affected with any disease presumably communicable, who by reason of the danger to others seems to require the attention of the public health authorities, to report at once to the health officer, within whose jurisdiction such case occurs, all facts relating to the illness and physical condition of such affected person.

Regulation 6. Reporting cases of communicable disease on dairy farms by physicians. When a case of Asiatic cholera, diphtheria, amoebic or bacillary dysentry, epidemic cerebrospinal meningitis, epidemic or septic sore throat, para-typhoid fever, poliomyelitis (infantile paralysis), scarlet fever, smallpox, or typhoid fever exists on any farm or dairy producing milk, cream, butter, or other dairy products for sale, it shall be the duty of the physician in attendance to report immediately to the health officer the existence on such farm or dairy of such case.

It shall be the duty of the health officer to report immediately to the state commissioner of health, by telephone or telegram, the existence, on such farm or dairy of such case, together with all facts as to the isolation of such case, and giving the names of the localities to which such dairy products are delivered.

Regulation 7. Reporting cases of disease presumably communicable on dairy farms by owner or person in charge. When

no physician is in attendance, it shall be the duty of the owner or person in charge of any farm or dairy producing milk, cream, butter, cheese, or other food products likely to be consumed raw, to report forthwith to the health officer the name and address and all facts relating to the illness and physical condition of any person who is affected with any disease presumably communicable and who is employed or resides on or in such farm or dairy, or comes in contact in any way therewith or with its products.

Regulation 8. Diphtheria; material for cultures to be submitted. In every case of illness which there is reason to suspect is diphtheria, it shall be the duty of the attending physician or of the health officer promptly to take material for cultures from the throat of the suspected person and submit the same for examination to a state, county, or municipal bacteriological laboratory, or to a laboratory approved by the state commissioner of health.

Regulation 9. Isolation of persons affected with communicable diseases. It shall be the duty of every physician, immediately upon discovering a case of communicable disease, to secure such isolation of the patient, or to take such other action, as is required by the special rules and regulations which from time to time may be issued by the health officer or by the state department of health.

Regulation 10. Adults not to be quarantined in certain cases. When a person affected with a communicable disease is properly isolated on the premises, except in cases of smallpox, adult members of the family or household, who do not come in contact with the patient or with his secretions or excretions, may, with the written consent of the health officer, continue their usual vocations, provided such vocations do not bring them in close contact with children, nor require that they shall handle food or food products intended for sale.

Regulation 11. Removal of cases of communicable disease. After isolation by the health officer no person, without permission from him, shall carry, remove, or cause or permit to be carried or removed from any room or building any person affected with diphtheria, scarlet fever, smallpox, or typhus fever.

Without permission from the health officer no person shall

carry, remove, or cause or permit to be carried or removed from or to any hotel, boarding house, lodging house, or other dwelling, any person affected with chickenpox, diphtheria, epidemic cerebrospinal meningitis, epidemic or septic sore throat, measles, mumps, poliomyelitis (infantile paralysis), scarlet fever, smallpox, typhus fever, or whooping cough.

Without permission from the health officer no master of any vessel or other person shall remove or aid in removing, or permit the removal, from any such vessel to the shore, of any person affected with any communicable disease.

Regulation 12. Removal of articles contaminated with infective material. Without instruction from the health officer no person shall carry, remove, or cause or permit to be carried or removed from any room or building any article which has been subject to contamination with infective material through contact with any person or with the secretions of any persons affected with Asiatic cholera, diphtheria, scarlet fever, smallpox, typhoid fever or typhus fever, until such article has been disinfected according to the special rules and regulations of the state department of health.

Regulation 13. Right of entrance and inspection. No person shall interfere with or obstruct the entrance to any house or building by any inspector or officer of the state or local health authorities, in the discharge of his official duties, nor shall any person interfere with or obstruct the inspection or examination of any occupant of any such house or building by any inspector or officer of the state or local health authorities, in the discharge of his official duties.

Regulation 14. Instructions as to disinfection of excreta in Asiatic cholera, dysentery, para-typhoid fever, and typhoid fever. It shall be the duty of the physician in attendance on any case suspected by him to be Asiatic cholera, dysentery, para-typhoid fever, or typhoid fever, to give detailed instructions to the nurse or other person in attendance in regard to the disinfection and disposal of the excreta. Such instructions shall be given on the first visit, and shall conform to the special rules and regulations of the state department of health. It shall be the duty of the nurse or person in attendance to carry out the disinfection in detail until its discontinuance is permitted by the health officer.

Regulation 15. Instructions as to disinfection of discharges in diphtheria, epidemic cerebrospinal meningitis, epidemic or septic sore throat, measles, poliomyelitis (infantile paralysis), scarlet fever, smallpox, and whooping cough. It shall be the duty of the physician in attendance on any case suspected by him to be diphtheria, epidemic cerebrospinal meningitis, epidemic or septic sore throat, measles, poliomyelitis (infantile paralysis), scarlet fever, smallpox, or whooping cough, to give detailed instructions to the nurse or other person in attendance in regard to the disinfection and disposal of the discharges from the nose, mouth and ears of the patient. Such instructions shall be given on the first visit and shall conform to the special rules and regulations of the state department of health. It shall be the duty of the nurse or person in attendance to carry out the disinfection in detail until its discontinuance is permitted by the health officer.

Regulation 16. Precautions to be observed by physicians and attendants. The physician or nurse or other necessary attendant upon a case of diphtheria, measles, or scarlet fever, after attendance upon the case, shall take precautions and practice measures of cleansing or disinfection of his person or garments to prevent the conveyance to others of infective material from the patient.

Regulation 17. Distribution of circulars. It shall be the duty of the health officer, as soon as a case of diphtheria, epidemic cerebrospinal meningitis, epidemic or septic sore throat, measles, poliomyelitis (infantile paralysis), scarlet fever, smallpox, typhoid fever, typhus fever, or whooping cough is reported to him, or as soon thereafter as possible, to give every family or individual living in the house or building, in which such case is, circulars of information and copies of any rules and regulations, printed in a language understood by such individual, concerning such disease which may be issued by the state department of health or this board. The health officer shall also notify every family or individual living in the house of the existence of such disease.

Regulation 18. Posting placards. When a case of diphtheria, epidemic cerebrospinal meningitis, measles, poliomyeltis (infantile paralysis), scarlet fever, smallpox, or typhus fever exists in any house, or apartment, or room, it shall be the duty of the

health officer to post upon such house, or apartment, or room, or rooms, in which such case is isolated, near the entrance thereof, a placard stating the existence therein of a communicable disease.

Regulation 19. Interference with placards. No person shall interfere with or obstruct the posting of any placard by any official of this board in or on any place or premises, nor shall any person conceal, mutilate, or tear down any such placard, except by permission of the health officer.

In the event of such placard being concealed, mutilated, or torn down, it shall be the duty of every occupant of the premises concerned immediately to notify the health officer.

Regulation 20. Preventing the spread of communicable diseases in institutions. It shall be the duty of the superintendent or person in charge of any hospital, or other institution, or dispensary, in which there is a person affected with any communicable disease, to take such steps as will, so far as practicable, prevent the spread of infection and trace its original source.

Regulation 21. Exposure of persons affected with communicable disease. No person shall permit any child, minor, or other person under his charge, affected with diphtheria, measles, poliomyelitis, acute anterior (infantile paralysis), scarlet fever, smallpox, or typhus fever, to associate with others than his attendants.

No person affected with any of said diseases shall expose himself in such manner as to cause or contribute to, promote or render liable their spread.

Regulation 22. Needless exposure to communicable disease forbidden. No person shall expose or permit the visiting, association, or contact of any child, minor, or other person under his charge, with any person affected with diphtheria, measles, scarlet fever, smallpox, typhus fever, or whooping cough, or with discharges of any kind from the person of a patient affected with any of said diseases.

No person shall needlessly expose himself, or visit, or associate, or come in contact with, a case of any of said diseases, or the discharges therefrom, or in any manner cause or contribute to, promote or render liable, the spread thereof.

Regulation 23. Exclusion from school of cases of disease presumably communicable. It shall be the duty of the principal or

other person in charge of any public, private, or Sunday school to exclude therefrom any child or other person affected with a disease presumably communicable until such child or other person shall have presented a certificate issued by the health officer or medical inspector or by the attending physician and countersigned by the health officer or by the medical inspector, stating that such child or other person is not liable to convey infective material.

Regulation 24. Exclusion from schools and gatherings of cases of certain communicable diseases. No person affected with chickenpox, diphtheria, epidemic cerebrospinal meningitis, epidemic or septic sore throat, German measles, measles, mumps, poliomyelitis (infantile paralysis), scarlet fever, smallpox, trachoma, or whooping cough, shall attend or be permitted to attend any public, private, or Sunday school, or any public or private gathering. Such exclusion shall be for such time and under such conditions as may be prescribed by the health officer, not inconsistent with the provisions of the sanitary code, these regulations or the special rules and regulations of the state department of health.

Regulation 25. Exclusion from schools and gatherings of children of households where certain communicable diseases exist. Every child who is an inmate of a household in which there is, or has been within fifteen days, a case of chickenpox, diphtheria, epidemic cerebrospinal meningitis, German measles, measles, mumps, poliomyelitis (infantile paralysis), scarlet fever, smallpox, or whooping cough, shall be excluded from every public, private, or Sunday school and from every public or private gathering of children for such time and under such conditions as may be prescribed by the health officer, not inconsistent with the provisions of the sanitary code, these regulations or the special rules and regulations of the state department of health.

Regulation 26. Precautions to be observed in chickenpox, German measles, mumps, and whooping cough. No person affected with chickenpox, German measles, mumps, or whooping cough shall be permitted to come in contact with or to visit any child who has not had such disease or any child in attendance at school.

Regulation 26-a. Chancroid, gonorrhoea and syphilis. Chancroid, gonorrhoea and syphilis are hereby declared to be infectious and communicable diseases highly dangerous to the public health.

It shall be the duty of every physician when first attending a person affected with chancroid, gonorrhoea or syphilis to furnish said person with a circular of information issued or approved by the state commissioner of health and to instruct such person as to the precautions to be taken in order to prevent the communication of the disease to others.

Regulation 26-b. Records of venereal diseases not to be divulged. The records of the health officer in reference to cases of chancroid, gonorrhoea and syphilis shall not be divulged or made public so as to disclose the identity of the persons to whom they relate by any person, except insofar as may be authorized by the public health council.

Regulation 27. Isolation or removal in smallpox. It shall be the duty of the health officer whenever a case of smallpox occurs in his jurisdiction, if a suitable hospital is available, to remove or cause to be removed such case promptly thereto. Every inmate of the household where such case occurs, and every person who has had contact with such case, or with his secretions or excretions, shall be either vaccinated within three days of his first exposure to the disease or placed under quarantine and, when vaccinated, the name and address of such inmate or other person shall be taken and such inmate or other person shall be kept under daily observation. Such observation shall continue until successful vaccination results, or for at least twenty days. If such inmate or other person refuses to be vaccinated, he shall be quarantined until discharged by the health officer.

If there is no hospital available, the patient shall be isolated and every inmate of the household shall be vaccinated or strictly quarantined until discharged by the health officer.

Whenever a case of smallpox occurs in his jurisdiction, it shall be the duty of the health officer to use all diligence in securing the names and addresses of all persons who have had contact with such case, and in causing such persons to be either vaccinated or placed under quarantine.

Regulation 28. Removal to hospital or isolation and restriction of visiting in certain cases. It shall be the duty of the health

officer to remove, or cause to be removed, every case of diphtheria, measles, scarlet fever, or poliomyelitis, acute anterior (infantile paralysis), promptly to a suitable hospital, or to see that such case is properly isolated. Such isolation shall be maintained until its discontiuance is permitted by the health officer.

No person, except the physician and the nurse or other person in attendance, shall be permitted to come in contact with or to visit a case of diphtheria, measles, scarlet fever, or poliomyelitis, acute anterior (infantile paralysis), except by permission of the health officer.

Regulation 29. Removal to hospital or isolation, and provision for persons who cannot be removed. It shall be the duty of the health officer, whenever a case of diphtheria, scarlet fever, or typhus fever occurs in a lodging house, hotel, or boarding house, if suitable hospital facilities are available, to remove or cause to be removed such case promptly thereto, unless in the judgment of such officer, the case can be safely isolated.

Regulation 30. Quarantine in certain emergencies. When any case of diphtheria, epidemic cerebrospinal meningitis, measles, scarlet fever, smallpox, poliomyelitis, acute anterior (infantile paralysis), or typhus fever is not or cannot be properly isolated on the premises and cannot be removed to a suitable hospital, it shall be the duty of the health officer to forbid any member of the household from leaving the premises, except under such conditions as he may specify and except as provided by regulation eleven of this chapter.

Regulation 31. Maximum period of incubation. For the purpose of these regulations, the maximum period of incubation (that is, between the date of the exposure to disease and the date of its development), of the following communicable diseases is hereby declared to be as follows:

Chickenpox	21 days
Measles	14 days
Mumps	21 days
Poliomyelitis, acute anterior (infantile paralysis)	14 days
Scarlet fever	7 days
Smallpox	20 days
Whooping cough	14 days

Regulation 32. Minimum period of isolation. The minimum period of isolation, within the meaning of these regulations, shall be as follows:

Chickenpox, until twelve days after the appearance of the eruption and until the crusts have fallen and the scars are completely healed.

Diphtheria (membranous croup), until two successive negative cultures have been obtained from the nose and throat at intervals of not less than twenty-four hours, the first of such cultures being taken not less than nine days from the day of the onset of the disease.

Measles, until seven days after the appearance of the rash and until all discharges from the nose, ears and throat have disappeared and until the cough has ceased.

Mumps, until two weeks after the appearance of the disease and one week after the disappearance of the swelling.

Poliomyelitis, acute anterior (infantile paralysis), until three weeks from the day of the onset of the disease.

Scarlet fever, until thirty days after the development of the disease and until all discharges from the nose, ears and throat, or suppurating glands have ceased.

Smallpox, until fourteen days after the development of the disease and until scabs have all separated and the scars completely healed.

Whooping cough, until eight weeks after the development of the disease or until one week after the last characteristic cough.

Regulation 33. Sale of foods forbidden in certain cases. When a case of diphtheria, epidemic or septic sore throat, amoebic or bacillary dysentery, epidemic cerebrospinal meningitis, scarlet fever, smallpox, poliomyelitis, acute anterior (infantile paralysis), or typhoid fever exists on any farm or dairy producing milk, cream, butter, cheese, or other foods likely to be consumed raw, no such foods shall be sold or delivered from such farm or dairy, except under the following conditions:

(a) That such foods are not brought into the house where such case exists;

(b) That all persons coming in contact with such foods eat, sleep and work wholly outside such house;

(c) That such persons do not come in contact in any way with such house or its inmates or contents;

(d) That said inmates are properly isolated and separated from all other parts of said farm or dairy, and efficiently cared for; and

(e) That a permit is issued by the health officer.

Regulation 34. Destruction of foods in certain cases. When a case of diphtheria, epidemic or septic sore throat, amoebic or bacillary dysentery, epidemic cerebrospinal meningitis, scarlet fever, smallpox, poliomyelitis, acute anterior (infantile paralysis), or typhoid fever exists on any farm or dairy producing milk, cream, butter, cheese, or other foods likely to be consumed raw, the state commissioner of health or the health officer may destroy or order the destruction of any such foods which in his opinion may have been so contaminated as to be a source of danger.

Regulation 35. Handling of food forbidden in certain cases. No person affected with any communicable disease shall handle food or food products intended for sale, which are likely to be consumed raw or liable to convey infective material.

No person who resides, boards, or lodges in a household where he comes in contact with any person affected with bacillary dysentery, diphtheria, epidemic or septic sore throat, measles, scarlet fever, poliomyelitis, acute anterior (infantile paralysis), or typhoid fever, shall handle food or food products intended for sale.

No waiter, waitress, cook, or other employee of a boarding house, hotel, restaurant, or other place where food is served, who is affected with any communicable disease, shall prepare, serve, or handle food for others in any manner whatsoever.

No waiter, waitress, cook, or other employee of a boarding house, hotel, restaurant, or other place where food is served, who lodges or visits in a household where he comes in contact with any person affected with bacillary dysentery, diphtheria, epidemic or septic sore throat, measles, scarlet fever, poliomyelitis, acute anterior (infantile paralysis), or typhoid fever shall prepare, serve or handle food for others in any manner whatsoever.

Regulation 36. Carriers of disease germs. Any person who is a carrier of the disease germs of Asiatic cholera, bacillary

dysentery, diphtheria, epidemic cerebrospinal meningitis, poliomyelitis (infantile paralysis), or typhoid fever, shall be subject to the special rules and regulations of the state department of health.

Regulation 37. Reports of food poisoning. When any physician or the superintendent or person in charge of any hospital, other institution, or dispensary, or any visiting nurse or public health nurse, or the person in charge of any labor or other camp shall have knowledge of the occurrence of a number or group of cases of severe or fatal illness believed to have been due to the consumption of articles of food suspected to have been spoiled or poisonous, it shall be the duty of such physician, superintendent, nurse, or other person to report the same immediately, by telephone or telegram, when practicable, to the health officer.

It shall be the duty of the health officer to report immediately to the state commissioner of health, by telephone or telegram, when practicable, the occurrence of a number or group of such cases.

Regulation 38. Duties of physicians and other persons concerning tuberculosis. It shall be the duty of every physician or other person required to perform any duty under sections three hundred and twenty to three hundred and thirty, both inclusive, of article sixteen of the public health law, providing for the reporting and control of cases of tuberculosis, to take all steps incumbent on him and necessary to carry into effect the provisions of the said law.

Regulation 38-a. Duties of health officers on receiving report of an apparent case of tuberculosis. Upon receiving word in writing of an apparent case of tuberculosis, as authorized by section three hundred and twenty of the public health law, the health officer shall thereupon take the following steps:

1. If the alleged case has been previously reported to him by a physician as having tuberculosis and the latter has elected to assume the sanitary supervision thereof as permitted in section three hundred and twenty-eight of the public health law, the health officer shall ascertain promptly whether such physician is maintaining proper sanitary supervision.

2. If the alleged case has not been previously reported to him as having tuberculosis, the health officer shall take proper measures to determine whether there is reason to believe such person is affected with pulmonary tuberculosis and if by suitable physical or sputum examination, or both, he ascertains that the person is affected with pulmonary tuberculosis he shall then proceed in accordance with the provisions of the public health law and the rules of the state department of health.

Regulation 39. Cleansing, renovation, and disinfection required. Adequate cleansing of rooms, furniture and belongings, when deemed necessary by the health officer, or required by the sanitary code, these regulations or otherwise by law, shall immediately follow the recovery, death, or removal of a person affected with a communicable disease. Such cleansing shall be performed by and at the expense of the occupant of said premises, upon the order and under the direction of the health officer, in accordance with the sanitary code and these regulations.

Adequate renovation of premises, when deemed necessary by the health officer, or required by the sanitary code or these regulations or otherwise by law, shall immediately follow the recovery, death, or removal of a person affected with a communicable disease. Such renovation shall be performed by and at the expense of the owner of said premises or his agents, upon the order and under the direction of the health officer, in accordance with the sanitary code and these regulations.

Adequate disinfection of premises, furniture and belongings, when deemed necessary by the health officer or required by the sanitary code, these regulations or otherwise by law, shall immediately follow the recovery, death, or removal of a person affected with a communicable disease. Such disinfection shall be performed by or under the direction of the health officer in accordance with the sanitary code or these regulations, and at the public expense unless otherwise provided pursuant to law.

Regulation 40. Methods and precautions in cleansing, renovation and disinfection. The following methods and precautions shall be observed in cleansing, renovation and disinfection:

(a) Cleansing shall be secured by the thorough removal of

dust and other contaminating material in such a way as to prevent the entry thereof, as far as may be possible, into other rooms or dwellings; washing with soap and water; scouring; airing; and exposure to sunlight; in accordance with the special rules and regulations of the state department of health.

(b) Renovation shall be secured by removing old paper from walls and ceilings, and repainting, recalcimining, or repapering of walls, ceilings, and woodwork as may be ordered by the health officer in accordance with the special rules and regulations of the state department of health.

(c) Disinfection of rooms shall be secured by the use of such disinfecting agents in such quantities and in such manner and of such sterilizing procedures as may be ordered by the health officer, in accordance with the special rules and regulations of the state department of health. When gaseous disinfectants are to be used, all cracks, crevices, and openings into the room shall first be pasted over with paper. Thereafter, all rugs, carpets, upholstered furniture, and such textile fabrics in the said room as cannot, in the opinion of the health officer, be washed or soaked in a disinfecting solution, may be removed for disinfection by steam when ordered by the health officer, in accordance with the special rules and regulations of the state department of health.

Regulation 41. Destruction of furniture, clothing and other articles. Furniture, bedding, clothing, carpets, rugs, and other articles, which may have been contaminated with infective material from any case of diphtheria, scarlet fever, or smallpox, and which are of such a nature or in such condition that they cannot, in the opinion of the health officer, be properly cleansed, disinfected, or sterilized, shall upon his order be destroyed in the manner designated by him.

Regulation 42. Cleansing and disinfection of the person. It shall be the duty of the patient, upon convalescence or recovery from any communicable disease, and of the nurse or persons in attendance on such case, throughout the course of the disease as well as at its close, suitably to cleanse and, when necessary, to disinfect their persons in accordance with the manner prescribed by the special rules and regulations of the state department of health.

Regulation 43. Letting of rooms forbidden while contaminated with infective material. No proprietor of a hotel, boarding house, or lodging house shall let for hire or cause or permit anyone to occupy a room or apartment previously occupied by a person affected with diphtheria, epidemic cerebrospinal meningitis, measles, poliomyelitis (infantile paralysis), scarlet fever, smallpox, tuberculosis, or typhus fever, until such room or apartment has been cleansed, renovated, or disinfected, under the direction of the health officer.

When an order requiring the cleansing, renovation, or disinfection of articles or premises is not complied with the health officer shall post a placard on the premises, reading as follows:

"Notice: These apartments have (or this room has) been occupied by a person affected with ..... They (or it) must not again be occupied until orders for cleansing, renovation, or disinfection have been complied with. This notice must not be removed under penalty of the law.

Date .....

..... Health Officer."

Regulation 44. Placarding by common carriers. When the declaration in reference to common carriers receiving or admitting persons for carriage or transportation within this municipality has been made by the state commissioner of health in accordance with the provisions of regulation fifty of chapter two of the sanitary code, and a common carrier of passengers or officer or agent thereof is notified by the state commissioner of health or by the health officer of such declaration, it shall be the duty of such common carrier operating public conveyances in this municipality to forthwith conspicuously place or post in every station within such area as the state commissioner of health may designate, and in every conveyance, the placard hereinafter described and to keep the same posted until the epidemic is declared ended by the state commissioner of health."

"WARNING

THERE IS AN OUTBREAK OF ..... IN .....

(give name of the disease)

PASSENGERS ARE CAUTIONED.

STATE COMMISSIONER OF HEALTH."

Said placard shall be in heavy block letters in red ink on a white background, with each letter not less than two inches in height and one and a half inches in width, and shall be posted so that the same shall be in plain view of passengers when they are seated.

Regulation 45. Duties of undertakers. It shall be the duty of every undertaker taking charge of the preparation for burial of the body of any person to ascertain whether such person died of a communicable disease and if such person died of Asiatic cholera, diphtheria, epidemic cerebrospinal meningitis, glanders, plague, scarlet fever, smallpox, or typhus fever it shall be his duty to cause it immediately to be wrapped in a sheet saturated with disinfecting solution and promptly thereafter placed in a coffin or casket, which shall then be immediately and permanently closed. This regulation shall not be construed to prohibit the embalming of any such body, but the undertaker shall cause such embalming to be done immediately upon taking charge of the body, except that, when a permit for embalming is required, this shall not proceed until the receipt of such permit. But immediately after the embalming he shall cause such body to be wrapped in a sheet and placed in a coffin or casket as hereinabove directed.

After handling, embalming, or preparing for burial the body of a person dead of any of the communicable diseases enumerated in this regulation, such parts of the persons, garments, and utensils or other articles of the undertaker or his assistants, as may have been liable to contamination with infective material, shall be immediately cleansed or disinfected or sterilized in the manner prescribed by the rules and regulations of the state department of health.

Regulation 46. Public funerals forbidden in certain cases. A public or a church funeral shall not be held of any person who has died of diphtheria, measles, scarlet fever, smallpox, or typhus fever; but any funeral of such person shall be private.

CHAPTER IV

Milk and Cream

Regulation 1. Permit required for sale of milk. No corporation, association, firm or individual shall sell or offer for sale at retail milk or cream without a permit from the health officer, which shall be issued subject to such conditions as may be imposed by the sanitary code, these regulations and the health officer. Such permit shall expire on the thirty-first day of March next after its issuance and shall be renewable on or before such date in each year and may be revoked at any time for cause by the state commissioner of health or by the health officer after a hearing on due notice.

Regulation 2. Application for permit required. No permit for the sale at retail of milk or cream shall be issued unless written application, sworn to by the applicant, has been made therefor in the form prescribed by the state commissioner of health.

Regulation 3. Information required in application for permit. Every application for a permit to sell at retail milk or cream shall contain the name of each producer from whom the applicant receives or expects to receive milk or cream for sale, together with the approximate amount of milk or cream to be furnished by each such producer, and upon change in the source or amount of supply notice thereof shall be given promptly to the health officer.

Regulation 4. Dairy farms to be inspected and scored. On or after the first day of January of each year the health officer shall make a sanitary inspection of every dairy farm where milk or cream is produced for sale at retail and shall score each such dairy farm on the score card prescribed by the state commissioner of health.

The health officer may, however, in his discretion accept the inspection and scoring by the health officer, or his representative, of another municipality.

Regulation 5. Conditions of issuance of permit. No permit to sell at retail milk or cream shall be issued unless the premises, where it is proposed to handle such milk or cream, shall, in the

opinion of the health officer or his representative after inspection, have been rendered clean and sanitary; and unless each farm or dairy, where such milk or cream is produced, shall have been rated after inspection by a health officer or his representative, or, in case of protest, by a sanitary supervisor of the state department of health, at least forty per cent on the score card prescribed by the state commissioner of health.

Regulation 6. Conditions of renewal of permit. No permit to sell at retail milk or cream shall be renewed unless inspection has been made within the preceding six months by the health officer or his representative of the premises where such milk or cream is handled and unless each farm or dairy where such milk or cream is produced has been rated by a health officer or his representative, or, in case of protest, by a sanitary supervisor of the state department of health, within the preceding six months after inspection at least forty per cent on the score card prescribed by the state commissioner of health.

Regulation 7. Public display of permit. Permits to sell milk or cream shall be publicly displayed in such manner as may be prescribed by the health officer.

Regulation 8. Milk and cream to be kept only under sanitary conditions. No milk or cream shall be sold or kept for sale under any conditions which in the opinion of the health officer are not clean and sanitary.

All vessels containing such milk or cream for sale shall at all times be covered, kept cool, and so placed that the contents will not be exposed to sun, dust, dirt, flies or other insects.

Regulation 9. Condition of bottling of milk and cream. No milk or cream shall be served or sold in bottles or offered for sale in bottles, unless the bottling is done under clean and sanitary conditions at the place of production or at the collecting or distributing station.

Each bottle shall be capped and each cap shall show the name of the producer or dealer and the place of bottling.

Regulation 10. Receptacles to be kept in sanitary condition; when to be condemned and seized. Every can or other vessel, which is used to contain milk or cream intended for sale, shall be constantly kept in a clean and sanitary condition. When

emptied and before being returned by the person to whom it was last delivered full or partly full every such can or other vessel shall be effectively cleansed. The health officer or his representative shall condemn any such can or other vessel found by him to be in such condition that it cannot be rendered by washing clean and sanitary as a receptacle for milk or cream, and shall destroy or so mark the condemned vessel as to show that it has been condemned. When so condemned and marked, such can or other vessel shall not be used again to contain milk or cream for sale. The health officer or his representative may seize and hold as evidence any can or other vessel returned or otherwise used in violation of this regulation.

Regulation 11. Utensils to be cleansed. All dippers, measures, or other utensils used in the handling of milk or cream intended for sale shall be maintained in a cleanly condition.

Regulation 12. Pasteurization. No milk or cream shall be sold or offered for sale as pasteurized unless it has been subjected to a temperature of 142 to 145 degrees Fahrenheit for not less than thirty minutes; and no milk or cream which has been heated by any method shall be sold or offered for sale unless the heating conforms to the provisions of this regulation.

After pasteurization the milk or cream shall be immediately cooled and placed in clean containers and the containers shall be immediately sealed.

Regulation 13. Designations of milk and cream restricted. All milk sold and offered for sale at retail shall bear one of the designations provided in this regulation, which constitutes the minimum requirements permitted in this municipality.

No term shall be used to designate the grade or quality of milk or cream which is sold or offered for sale, except

"Certified"
"Grade A raw"
"Grade A pasteurized"
"Grade B raw"
"Grade B pasteurized"
"Grade C raw"
"Grade C pasteurized"

Certified. No milk or cream shall be sold or offered for sale as "Certified" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the health officer.

All cows producing such milk or cream must have been tested at least once during the previous year with tuberculin, and any cow reacting thereto must have been promptly excluded from the herd. The reports of such tuberculin tests must be filed with the health officer and the milk commission of the County Medical Society in the municipality and county respectively in which such milk is delivered to the consumer.

Such milk must not at any time previous to delivery to the consumer contain more than 10,000 bacteria per cubic centimeter and such cream not more than 50,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than thirty-five per cent for equipment and not less than fifty-five per cent for methods.

Such milk and cream must be delivered within thirty-six hours of the time of milking.

Such milk and cream must be delivered to consumers only in containers filled at the dairy or central bottling plant.

The caps must contain the word "Certified" and bear the certification of a milk commission appointed by the County Medical Society organized under and chartered by the Medical Society of the State of New York, and must also contain the name and address of the dairy as well as the date of milking.

Every employee before entering upon the performance of his duties shall be examined by a duly licensed physician and the reports of such examination shall be sent to the milk commission certifying the milk from such dairy.

The milkers and all persons handling the milk must be provided with suits and caps of washable material which shall be worn while milking or handling the milk and shall not be worn at other times. When not in use these garments must be kept in a clean place free from dust. Not less than two clean suits and caps must be furnished weekly. The hands of the milkers must

be washed with soap and hot water, and well dried with a clean towel, before milking.

Grade A raw. No milk or cream shall be sold or offered for sale as "Grade A raw" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the health officer.

All cows producing such milk or cream must have been tested at least once during the previous year with tuberculin, and any cow reacting thereto must have been promptly excluded from the herd.

Such milk must not at any time previous to delivery to the consumer contain more than 60,000 bacteria per cubic centimeter, and such cream not more than 300,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health and not less than twenty-five per cent for equipment, and not less than fifty per cent for methods.

Such milk and cream must be delivered within thirty-six hours from the time of milking, unless a shorter time shall be prescribed by the health officer.

Such milk and cream must be delivered to consumers only in containers sealed at the dairy or a bottling plant. The caps or tags must be white and contain the term "Grade A raw" in large black type, and the name and address of the dealer.

Grade A pasteurized. No milk or cream shall be sold or offered for sale as "Grade A pasteurized" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the health officer.

All cows producing such milk or cream must be healthy as disclosed by an annual physical examination.

Such milk or cream before pasteurization must not contain more than 200,000 bacteria per cubic centimeter.

Such milk must not at any time after pasteurization and previous to delivery to the consumer contain more than 30,000 bacteria per cubic centimeter, and such cream not more than 120,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than twenty-five per cent for equipment and not less than forty-three per cent for methods.

Such milk and cream must be delivered within thirty-six hours after pasteurization, unless a shorter time shall be prescribed by the health officer.

Such milk and cream must be delivered to consumers only in containers sealed at the dairy or a bottling plant. The caps or tags must be white and contain the term "Grade A pasteurized" in large black type.

Grade B raw. No milk or cream shall be sold or offered for sale as "Grade B raw" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the health officer.

All cows producing such milk or cream must be healthy as disclosed by an annual physical examination.

Such milk must not at any time previous to delivery to the consumer contain more than 200,000 bacteria per cubic centimeter, and such cream not more than 750,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than twenty-three per cent for equipment and not less than thirty-seven per cent for methods.

Such milk and cream must be delivered within thirty-six hours from the time of milking unless a shorter time shall be prescribed by the health officer.

The caps or tags on the containers must be white, and contain the term "Grade B raw" in large bright green type, and the name of the dealer.

Grade B pasteurized. No milk or cream shall be sold or offered for sale as "Grade B pasteurized" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the health officer.

All cows producing such milk or cream must be healthy as disclosed by an annual physical examination.

Such milk or cream before pasteurization must not contain more than 1,500,000 bacteria per cubic centimeter.

Such milk must not at any time after pasteurization and previous to delivery to the consumer contain more than 100,000 bacteria per cubic centimeter, and such cream not more than 500,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than twenty per cent for equipment and not less than thirty-five per cent for methods.

Such milk must be delivered within thirty-six hours, and such cream within forty-eight hours after pasteurization, unless a shorter time shall be prescribed by the health officer.

The caps or tags on the containers must be white and contain the term "Grade B pasteurized" in large bright green type, and the name of the dealer.

Grade C raw. No milk or cream shall be sold or offered for sale as "Grade C raw" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the health officer.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than forty per cent.

Such milk and cream must be delivered within forty-eight hours from the time of milking, unless a shorter time shall be prescribed by the health officer.

The caps or tags affixed to the containers must be white and contain the term "Grade C raw" in large red type.

Grade C pasteurized. No milk or cream shall be sold or offered for sale as "Grade C pasteurized" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the health officer.

Such milk and cream must be produced on farms which are duly scored on the score card prescribed by the state commissioner of health not less than forty per cent.

Such milk and cream must be delivered within forty-eight

hours after pasteurization, unless a shorter time shall be prescribed by the health officer.

The caps or tags affixed to the containers must be white and contain the term "Grade C pasteurized" in large red type.

The bacterial count herein required shall be made only at county or municipal laboratories or such other laboratories as may be approved by the state commissioner of health.

CHAPTER V

Labor Camps

Regulation 1. Pollution of waters prohibited. All persons living in the open or in camps, tents, or other temporary shelters shall exercise every proper and reasonable precaution to dispose of their wastes so that springs, lakes, reservoirs, streams and other watercourses shall not be polluted.

Regulation 2. Notice of labor or construction camp to be occupied by five or more persons to be given health officer. Every railroad or other corporation, contractor, lumberman or other person who shall establish, construct or maintain within this municipality any labor or construction camp to be occupied by five or more persons, and the person in charge of any temporary living quarters on wheels or otherwise that shall be provided for five or more workmen, shall at once notify the health officer of the presence or location of such quarters or camp.

Regulation 3. Health officer to inspect and pass on location and sanitary conditions of camps. It shall be the duty of the health officer when notified of the establishment of any camp with temporary buildings, on wheels or otherwise, in his jurisdiction promptly to inspect and determine the propriety of the location of the camp and of its sanitary conditions. If the location or manner of operation of the camp be found by him to be detrimental to the public health he shall cause the camp to be removed or the manner of its operation to be corrected.

Regulation 4. Permit required for labor or construction camp to be occupied by more than ten persons for more than six days. No railroad or other corporation, contractor, lumberman or other person shall establish, construct or maintain any labor or construction camp to be occupied by ten or more persons for a period of more than six days without a permit from the health officer.

Whenever any such camp shall be vacated, the person in charge thereof shall forthwith notify the health officer and surrender to him the permit therefor.

Regulation 5. Application required for permit. Application for such permit shall be made in writing to the health officer.

The application shall state the exact situation of the proposed camp, the type of camp to be established, the approximate number of persons to be maintained, the probable duration of stay, the proposed source of water supply for the camp, and the proposed method of sewage and garbage disposal.

Regulation 6. Conditions of issuance of permit; may be revoked. If the health officer is satisfied after inspection that the proposed camp will not be a source of danger to the health of others or to its inmates, he shall issue the necessary permit in writing in a form to be prescribed by the state commissioner of health.

In case the health officer declines to issue the permit an appeal may be taken to the state commissioner of health, who may grant a permit.

Any such permit may be revoked for cause by the health officer or by the state commissioner of health, after a hearing.

Regulation 7. Health officer to be notified of the name of the person responsible for sanitary condition of camp. It shall be the duty of the owner, manager or foreman of a labor or construction camp occupied by twenty or more persons to detail one person who shall be responsible for the sanitary condition of the camp and to notify the health officer of the name of such person.

Regulation 8. No building, tent or car in any camp to be nearer than fifty feet of water's edge of public water supply. In every camp or temporary quarters the nearest part of any building, tent, car or shed shall be at least fifty feet in a horizontal direction from the water's edge of any stream, lake or reservoir, the waters of which are used for a public water supply.

Regulation 9. Suitable privy or other toilet facilities to be provided and used. For every camp there shall be provided convenient and suitable privy or other toilet facilities approved by the health officer, which the occupants of the camp shall be required to use instead of polluting the ground.

Regulation 10. Construction of privies more than two hundred feet from the water's edge. If such privy be more than two hundred feet from the water's edge of any spring, stream, lake or reservoir forming a part of a public or private water supply, it shall consist of a pit at least two feet deep, with suitable shelter over the same. No such pit shall be filled with excreta to nearer than one foot from the surface of the ground and the excreta in the pit shall always be covered with earth or ashes. If the camp be occupied for more than six days between May 1 and November 1 the shelter and pit shall be enclosed in fly netting.

Regulation 11. Construction and care of privies located between 50 and 200 feet from the water's edge. If such privy is to be between 50 and 200 feet from the waters of a spring, stream, lake or reservoir forming part of a public or private water supply, there shall be no pit, but the excreta shall be received in a water-tight tub or bucket and periodically, as often as may be found necessary, shall be taken away and disposed of. Such privy shall be properly screened against flies and kept in a clean and sanitary condition; the pails or buckets shall not be allowed to fill so that they overflow or spill in carrying, and the construction of the privy shall be such that the convenient removal and replacement of the tubs or buckets is facilitated.

Regulation 12. Disposal of wastes from privies. The pails or buckets used in privies located between 50 and 200 feet from the water's edge, as referred to in regulation 11, shall when not more than three-quarters filled be removed from the privy and carried at least 200 feet from the water's edge and the contents there either burned or buried in a trench at least two feet deep so that when buried there shall be at least one foot of earth cover. The tubs or buckets immediately after being emptied shall be rinsed out with a suitable disinfectant as particularly prescribed for such purposes by the special rules and regulations of the state department of health and the rinsing fluid shall also be emptied into the trench.

Regulation 13. Garbage to be disposed of in suitable manner. All garbage, kitchen wastes and other rubbish in camps shall be deposited in suitable covered receptacles which shall be emptied daily or oftener if necessary, and the contents burned, buried or

otherwise disposed of in such a way as not to be or become offensive or insanitary.

Regulation 14. Water rules to be observed. Whenever a camp is established on the banks of a spring, lake, reservoir, stream or other watercourse which is a source of water supply protected by water rules formulated by the state commissioner of health, no bathing or washing by the occupants of said camp shall be allowed in said springs, lakes, reservoirs, streams or other watercourses, and all said water rules shall be strictly observed. There shall be furnished by the health officer and conspicuously posted in such camp a copy of said rules or parts thereof as may be considered necessary by the state commissioner of health.

Regulation 15. Location and drainage of stables regulated. No stable or other shelter for animals shall be maintained within one hundred feet of any living quarters in a camp, nor within one hundred and fifty feet of any kitchen or messroom therein. No drainage from such stable or shelter shall be permitted to empty directly into any spring, lake, reservoir, stream or other watercourse forming part of a public or private water supply.

Regulation 16. Camps to be kept and left in clean and sanitary condition. All tents, cars, and buildings in, and the grounds surrounding camps shall at all times be kept and when definitely vacated be left in a clean and sanitary condition.

Regulation 17. Person in charge of camp to report cases of disease presumably communicable. It shall be the duty of the person in charge of any labor or other camp to enforce regulation six of chapter two of the sanitary code and of regulation five of chapter three hereof.

Regulation 18. Isolation of cases of communicable diseases; cases not to be removed without permission of health officer. Whenever a case of disease presumably communicable shall occur in any labor or construction camp it shall be the duty of the person in charge of the camp immediately to isolate the case. Such isolation shall be maintained in a manner approved by the health officer. The person in charge of the camp shall not allow the case to leave or be removed from such camp without the permission of the health officer.

Regulation 19. Duty to enforce regulations on person in charge. It shall be the duty of the superintendent, foreman or

other person in charge of a camp to see that all regulations of this chapter are faithfully observed.

Regulation 20. Supplementary rules and regulations. Labor and construction camps shall be subject to such special and supplementary rules and regulations as may from time to time be made by the state commissioner of health.

CHAPTER VI

Nuisances Which May Affect Life and Health

Regulation 1. Duty of health officer to abate nuisance likely to affect health; procedure.

§ 1. The health officer, upon receiving a complaint of the existence within his jurisdiction of a nuisance which may affect health, or when the probable existence of any such nuisance comes to his attention, shall make an immediate and thorough investigation, and if such nuisance exists he shall take all measures within his power and authority to secure its abatement.

§ 2. The health officer shall within five days of the receipt of the complaint file with the local board of health:

(a) the complaint, if made in writing, or if not made in writing, a summary thereof; or, if no complaint has been made, a statement of the facts, and

(b) a report showing

(1) his findings;

(2) his opinion as to whether or not the conditions amount to a nuisance likely to affect health;

(3) the action, if any, taken by him; and

(4) whether such nuisance has been abated.

§ 3. If said report of the health officer states that there is a nuisance likely to affect health which has not been abated, this board shall convene promptly, investigate the alleged nuisance, and take the necessary steps provided by law for its abatement or within a reasonable time from the filing of the health officer's report enter on its minutes its decision giving its reason for not taking action.

§ 4. Within forty-eight hours after the entry of such decision, the health officer shall forward a copy thereof to the state commissioner of health, together with the original or copies of the

papers filed by him with this board as required in subdivision two hereof.

§ 5. Upon the receipt of a notice from the state commissioner of health, pursuant to the provisions of section 26 of the public health law, the presiding officer of this board shall promptly convene this board, which shall take the action directed by the said commissioner.

CHAPTER VII

Miscellaneous

Regulation 1. Spitting in public places forbidden. Spitting upon the floor of public buildings or buildings used for public assemblage, or upon the floors or platforms or any part of any railroad or trolley car or ferry boat, or any other public conveyance, is forbidden.

Regulation 2. Common towel forbidden. No person, firm or corporation owning, in charge of, or in control of any lavatory or wash room in any hotel, lodging house, restaurant, factory, store, office building, railway or trolley station, or public conveyance by land or water shall provide in or about such lavatory or wash room any towel for common use. The term "common use" in this regulation shall be construed to mean for use by more than one person without cleansing.

Regulation 3. Common drinking cups and drinking and eating utensils forbidden. The use of common drinking cups and of common drinking or eating utensils in any public place or public institution, except in hospitals for the insane, or in any hotel, saloon, lodging house, theatre, factory, store, school or public hall; or in any railway or trolley car or ferry boat; or in any railway or trolley station or ferry house; or the furnishing of any such common drinking cup or drinking or eating utensil for common use in any such place is prohibited.

The term "common use" in this regulation shall be construed to mean, for use by more than one person without adequate cleansing.

Regulation 4. Barbers and barber shops. Every barber or other person in charge of any barber shop shall keep such barber shop at all times in a clean and sanitary condition.

No person shall act as a barber who is affected with a venereal

disease in the communicable stage or with any communicable disease enumerated in these regulations, in an acute form, or with any communicable disease of the skin.

The hands of the barber shall be washed with soap and water before serving each customer.

Brushes and combs shall frequently be cleansed with soap and water.

Shaving mugs and brushes shall be thoroughly rinsed after each use thereof.

There shall be a separate clean towel for each customer. The head rest shall be covered by a clean towel or paper.

Alum or other material used to stop the flow of blood shall be applied in powdered or liquid form only.

After the handling of a customer affected with any eruption, or whose skin is broken out, or is inflamed or contains pus, the hands of the barber shall be immediately disinfected. This shall be done by thorough washing with soap and water, followed by rinsing in alcohol (70 to 80 per cent) or in a solution of corrosive sublimate (1 to 1,000), or by the use of some equally efficient disinfectant.

The instruments used for a customer affected with any of the above named disorders shall be made safe immediately after such use by washing with soap and water and dipping for one minute in a ten per cent solution of commercial (40 per cent formalin; or dipping for three minutes in alcohol (70 to 80 per cent), or by the use of some equally efficient disinfectant.

No cup or brush which has been used in the shaving of a customer affected with any of the above infectious disorders of the face shall be used for another customer unless the cup shall have been emptied and cleansed by boiling water and furnished with fresh soap, and the brush has been sterilized by a three minutes' exposure to alcohol (70 to 80 per cent), or to a corrosive sublimate solution (1 to 1,000), or by the use of some equally efficient disinfectant.

Regulation 5. Manicures and chiropodists. The utensils and instruments employed by manicures and chiropodists in pursuit of their occupations shall be kept in a clean and sanitary condition.

After serving customers affected with a visible skin disease the hands and instruments of the operators shall be immediately cleansed and sterilized.

Regulation 6. Copies of regulations 4 and 5 to be posted. Every barber or other person in charge of any barber shop or place where manicuring or chiropody is done shall post a copy of regulations 4 and 5 of this chapter in a conspicuous place therein.

Regulation 7. Health officer to file monthly reports with the state commissioner of health. The health officer shall submit monthly reports to the state commissioner of health on forms to be prescribed by the state commissioner of health.

Regulation 8. Transportation of dead bodies by common carriers. The transportation of dead human bodies by common carriers shall be conducted in such manner as not to be a menace to health and the manner of transportation shall be subject to the special administrative regulations of the state commissioner of health.

Regulation 9. Midwives. No person shall practice midwifery, or hold herself out as a midwife, within this municipality unless she is duly licensed for that purpose as required by the public health law and the sanitary code.

DIVISION OF COMMUNICABLE DISEASES

DIVISION OF COMMUNICABLE DISEASES

HERMANN M. BIGGS, M. D., *Commissioner of Health, Albany, N. Y.:*

SIR.— I have the honor to submit the following report for the Division of Communicable Diseases for the year 1917.

Respectfully submitted,

PAUL B. BROOKS,
Acting Director

The Division of Communicable Diseases, as the title implies, is organized and maintained for the purpose of the control and suppression of communicable diseases in the State. While it would be out of place to enter into a detailed discussion of the many duties having to do solely with the control of communicable diseases, which devolve upon the Division, the writer may perhaps be permited to express his opinion that in a state in which in a year comparing favorably with previous years, approximately 107,000 cases of communicable disease are reported (not including New York City) the work of communicable disease control should command the entire time and attention of the present personnel of the Division. Until the time comes — as it undoubtedly will — when this opinion has become generally accepted, and it becomes possible to organize with this end in view, many activities which might otherwise be carried on, and which would react favorably upon the morbidity and mortality rate of the State, must necessarily be omitted.

Within the past two years, however, there has also fallen to the lot of the Director of the Division the supervision and coordination of the activities of the staff of district sanitary supervisors, formerly carried on by a Director of a Division of Sanitary Supervisors.

Perhaps because of the relative importance of communicable disease control among the duties of local health officers, to the Director of this Division has also been assigned the custody and supervision of the monthly reports of health officers, involving correspondence in regard to delinquency in reporting, numerous inquiries made upon reports etc.

On June 1, Capt. Fred M. Meader, Director of the Division, was called to service in the Medical Reserve Corps, U. S. Army, and the present Acting Director was appointed. During the year

several other changes, some of them temporary, have been made in the field staff. Among the sanitary supervisors, Dr. Le Roy W. Hubbard was appointed Orthopedic Surgeon in charge of poliomyelitis after-care work; Major Chas. A. Berry was called to active military service; Dr. Edward Clark was appointed to act for Major H. L. K. Shaw, Director of the Division of Child Hygiene, called to service in the M. R. C. U. S. Army; Dr. Stanley W. Sayer, of Gouverneur, Dr. Wm. L. Munson, of Granville, Dr. Edward H. Marsh, of Brooklyn, and Dr. Halsey J. Ball, of Cortland, were appointed to fill vacancies. Dr. Edward S. Godfrey, Jr., formerly epidemiologist in the Illinois State Health Department, was appointed epidemiologist, and stationed at Albany, and Dr. Herman F. Senftner, formerly assistant epidemiologist in the California State Health Department, acting epidemiologist, stationed at Buffalo, and assigned temporarily to a sanitary district. Dr. Godfrey was also assigned to a district, but the demands for his services as epidemiologist were so continuous that he was soon relieved of this assignment.

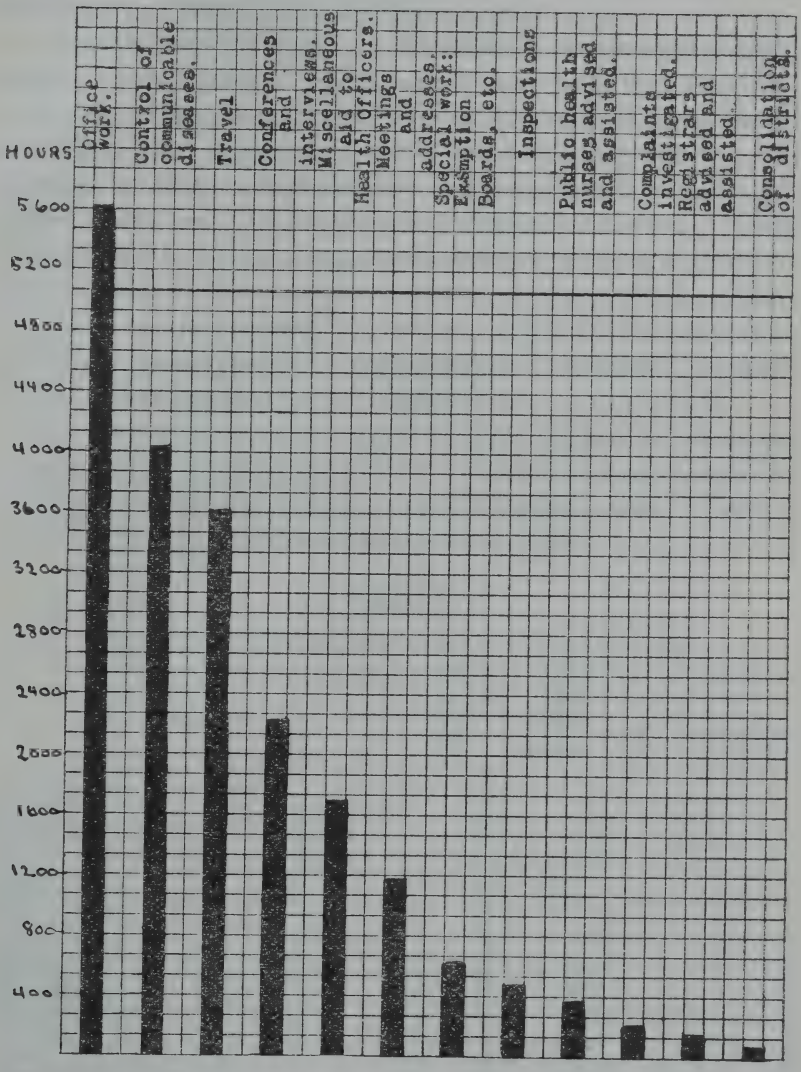
The sanitary supervisors

Last year, during the widespread epidemic of poliomyelitis, there was for the first time a general appreciation on the part of the public of the advantage of having a corps of trained sanitary officers stationed about the State.

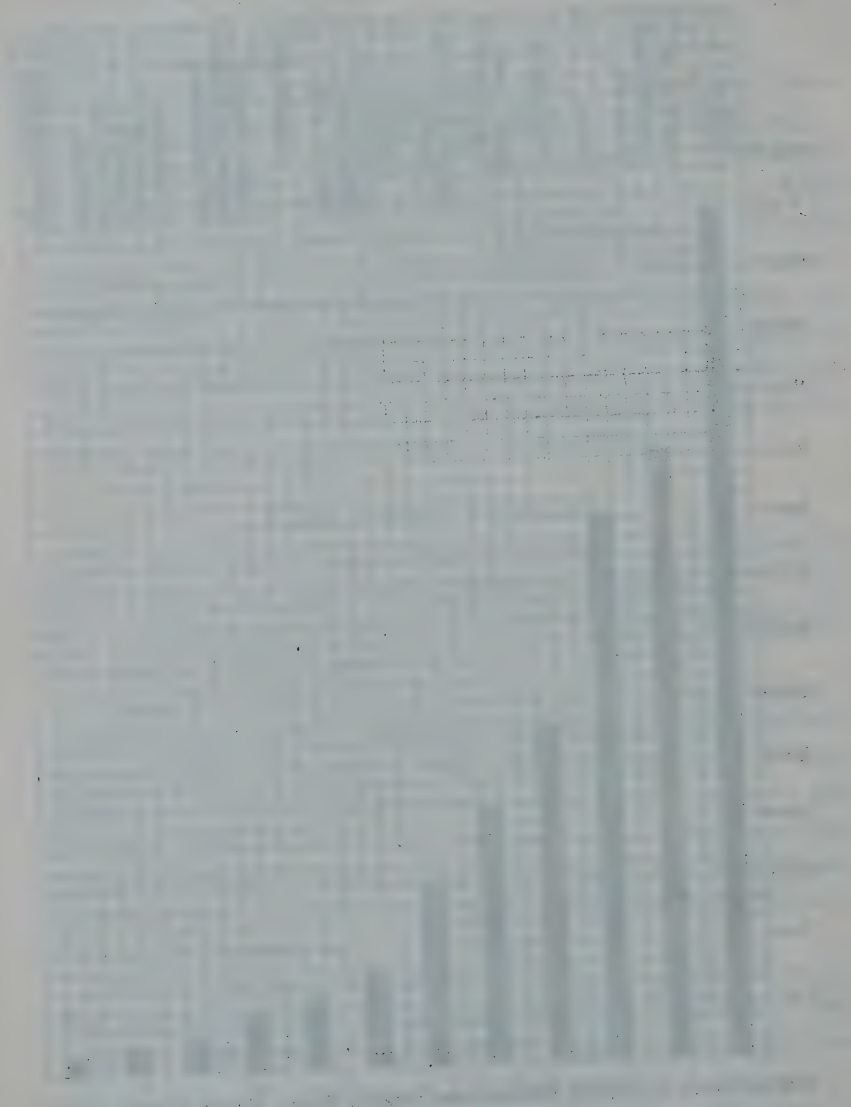
During 1917 the field staff has rendered no less effective, if somewhat less spectacular, service, particularly in connection with the prevention and control of outbreaks of communicable diseases. While certain sanitary supervisors have been called upon to take charge of extensive outbreaks of communicable disease and have rendered service attracting special notice and favorable comment, there has been no member of the staff who has not rendered faithful and efficient service.

It is perhaps not out of place at this time to comment on the fact that practically all of the older members of the staff — with reference to length of service — entered the service because of their interest in public health work and their desire to have a part in the constructive work following the reorganization of this Department; that many of them gave up work in which they were established and which was more lucrative, and have cheerfully

Chart 1



ACTIVITIES OF SANITARY SUPERVISORS DURING SEVEN MONTH PERIOD, 1917



adapted themselves to conditions at times conducive to anxieties and embarrassment; and that the spirit which has actuated such faithful service has contributed in some degree to the recognized success and efficiency of the Department. It is also a pleasure to report that the more recent appointees to the staff have rendered services fully justifying their selection.

A detailed weekly report is required of each sanitary supervisor. Table 1 presents a summary of four important activities: (1) work in connection with the control of communicable diseases; (2) advice and assistance rendered to local health officers; (3) meetings attended and addresses given on subjects pertaining to public health and (4) health board meetings attended. It will be noted that in several instances the number of items is relatively small, owing to the fact that certain of the supervisors were appointed late in the year, that one was called to military service and others were appointed during the year, temporarily or otherwise, to other positions in the Department.

The accompanying chart (between pages 96 and 97) indicates roughly, for comparison, the relative amount of time devoted by the staff of supervisors during a period of seven months—January 1 to August 1—to different kinds of activities.

Table I

SUMMARY OF WORK OF SANITARY SUPERVISORS

NAMES	Outbreaks investigated	Health officer advised and assisted	Meetings and addresses	Health board meetings attended
Ball, Halsey J.	11	57	9	23
Berry, C.	12	19	18	1
Brooks, P. B.	13	11	1	3
Clark, E.	9	95	30	3
Clark, J.	244	724	67	42
Conway, J.	84	438	19	3
Duryee, C. C.	13	96	10	11
Godfrey, E. S.	5	8	1	.....
Hervey, C. R.	33	155	5	22
Hubbard, L. W.	8	29	4	10
Laidlaw, F. W.	37	151	3	13
Mahoney, J. J.	50	162	.....	28
May, William B.	18	47	.....	1
Marsh, Edw. H.	36	89	19	15
Munson, Wm. L.	2	67	8	22
Overton, F.	9	32	3	14
Prest, C.	22	404	55	26
Sayer, S. W.	30	187	9	25
Sears, F. W.	48	560	33	53
Senftner, H. F.	30	188	3	15
Wakeman, B. R.	25	205	43	18
Walton, J. S.	23	253	41	44
Total	762	3,977	381	392

"Office work" appears most prominently, consuming approximately one-fourth of the total number of hours or approximately one and one-half days weekly. Much of the time spent by the supervisor in his office is devoted to official correspondence, study and preparation of reports, preparation of addresses, interviews with health officers and others regarding matters pertaining to health administration, either in person or by telephone, etc. The office of the district sanitary supervisor is usually made a local "clearing house" for information concerning matters in any way related to public health. For example, the supervisor may, be called upon for assistance in securing the admission of tuberculosis patients to hospitals; for advice to physicians in regard to the treatment of cases of communicable disease; for information to public officials or others in regard to interpretation of the state laws or local regulation. He is often called upon to receive complaints to be transmitted to local health officers; to advise individuals and organizations in regard to the organization of social service projects indirectly related to public health; to furnish current information to newspapers or to confirm or explain news items secured by correspondents, etc. In many instances supervisors are directly connected with local activities as members of boards and committees, all of which contribute to their usefulness as officials. A considerable part of the time spent by supervisors in their offices could properly and should be credited under other headings such as "control of communicable diseases," "conferences and interviews," "advice and assistance to health officers," etc.

In connection with the work of the sanitary supervisor there is considerable amount of very necessary routine office work, which, under present conditions, must be done very largely by the supervisor himself at the sacrifice of time which he might well devote to the numerous activities calling for his special training and experience. This could be done by a clerical assistant. A clerk at a small salary could not only perform routine clerical work but could answer questions and attend to matters now demanding the supervisor's time and attention, keep the office of the supervisor open in his absence in the field, and by being informed as to his whereabouts, make it possible for health officers and for this Department to reach him promptly at all times.

At present the allowance for expense for clerical and stenographic service is such that it is only possible for a supervisor to employ a clerk or stenographer for a few hours weekly and in many instances it is extremely difficult to secure such temporary services. We are of the opinion that to make it possible for each supervisor to employ a permanent clerk and stenographer would contribute materially to the latitude and effectiveness of the work of the staff of supervisors.

Time spent in "travel" will vary greatly with individual supervisors, depending upon the character and area of district covered. Naturally the amount of time thus spent will be in inverse proportion to the number of supervisors during any period.

While the detailed statistical report required of sanitary supervisors is of distinct value, it is obvious that no such report can indicate clearly all of the important service rendered. Not the least important among the duties of the sanitary supervisor is that of maintaining cordial relations and a spirit of cooperation among the various elements in his district. The skill and tact with which such inconspicuous service is rendered contribute materially to the support accorded to the Department and its activities.

The following field note which appeared in the October number of HEALTH NEWS, shows concretely some of the numerous kinds of service which a sanitary supervisor may be called upon to render.

Activities of a sanitary supervisor

An outbreak of 21 cases of typhoid fever in the village of Millbrook and town of Washington, Dutchess county, in July, furnished an opportunity for a State sanitary supervisor to do some effective epidemiological work and at the same time to render valuable service to the community. When the call came for assistance, one local physician had been called for military duty and the rest, including the health officer, were ill. It was necessary to assign the sanitary supervisor of the district to other important work in the district, and Sanitary Supervisor Ball of Glens Falls was assigned to take charge of the situation. The outbreak was promptly checked through the discovery of a typhoid carrier on a dairy farm supplying milk for sale, and the pasteurization of the milk supply.

Owing to the lack of physicians, Dr. Ball was given permission to respond to emergency sick calls, and on one occasion, after a busy day, devoted the night to attending a maternity case.

While at Millbrook, the attention of the sanitary supervisor was called to the prevalence of whooping cough in the village. A house-to-house canvass brought to light 72 cases, none of which had been reported. Pertussis vaccine was administered to 135 children and necessary isolation instituted. At about this time the management of Hope Farm, an institution for children at Verbank, reported the existence of 24 cases of whooping cough in the institution. All of the 185 inmates were vaccinated against the disease, isolation established and the outbreak checked.

Dr. Ball was also assigned to investigate conditions at the Farm Camp of the East Side Home for Destitute Children, at Sylvan Lake, 16 miles from Millbrook, from which four cases of diphtheria had been reported. Four diphtheria carriers and five scarlet fever cases were discovered and isolated.

In this connection, it has been the constant aim of the Division to respond promptly and cheerfully to all requests for assistance from local officials and in no instance now recalled have we failed to render the service requested. Aside from the relatively small number of such requests which come directly to this office, health officers are constantly calling directly upon their sanitary supervisors for advice and assistance. It is no reflection upon the ability of local health officers, most of whom are busy practitioners, to say that their close association with specialists in health work is contributing materially to the improving standards of local health work.

Acting with the approval of the Department certain of the supervisors are serving as members of or examiners for local selection boards. In this connection, during the closing weeks of 1917 and thereafter, the writer served during evenings, Saturday afternoons and during a vacation period of a week, upon the Albany County Legal Advisory Board.

Several of the supervisors have served during the year upon special committees, reports of which appear elsewhere. In one instance — that of the supervisor made secretary of the Venereal Disease Committee — work in this capacity has required a considerable part of his time.

On two occasions during the year the sanitary supervisors were called to the Albany office for conferences. Such conferences are of great value in that they offer opportunities for free and "first hand" discussion of field problems, policies and methods of procedure, and might advantageously be held at regular and more frequent intervals.

During the latter part of the year the supervisors met with a large number of local health boards, primarily for the purpose of securing adoption of a uniform sanitary code, but usually taking the opportunity to discuss other matters of importance and mutual interest.

During the winter conferences have been held in most of the sanitary districts. So far as possible a representative of the central office has attended each conference. At most of the later conferences the subject of venereal disease control was discussed. In several instances a stenographer has been furnished, and the detailed record of discussions thus obtained has been interesting and instructive. It is the general feeling among the health officers of the State that these local conferences are of the greatest value.

A special effort has been made to increase the educational work carried on by and at the instigation of the supervisors. A "Lecture Program" presenting a general outline of several subjects pertaining to public health, has been prepared and multigraphed copies sent to supervisors, with the understanding that it will be sent to others upon request. Of late two subjects, Venereal Diseases and Food Conservation and Health have been especially emphasized. Several county medical societies have been addressed by sanitary supervisors and by the writer, on the subject of control of venereal diseases. The writer feels that an important feature of the campaign against venereal disease is the stimulation of interest on the part of the medical profession.

Special attention has been given to measures for improving "lines of communication" between the sanitary supervisors and this office. For their general information press clippings received at this office and formerly destroyed after having been examined by directors of divisions, are now collected promptly, sorted, and sent to the various supervisors.

At the last conference of sanitary supervisors methods for keeping them informed as to prevalence of communicable diseases in their districts was discussed. In the past each supervisor has received weekly a sheet for each county in his district, giving the number of cases of each disease in each municipality by approximate dates of onset. For this it was decided to substitute similar weekly reports, but indicating cases by dates reported, thus

simplifying the report, reducing the amount of labor involved in this office, and avoiding duplications. A weekly report alone brought information to the supervisors too late to be of practical value. As a temporary expedient to meet the need, a postal card is now sent to each supervisor whenever an unusual prevalence of a communicable disease is noted in any municipality in his

Postal card report sent to Supervisors

FOR YOUR INFORMATION

..... cases of .....
have been reported from.....
within the past ..... days.

PAUL B. BROOKS, M. D.,
Acting Director, Division of Communicable Diseases.

district. A present "unusual prevalence" is determined arbitrarily depending for its relative accuracy upon the experience and judgment of those under whose surveillance the records pass. Consideration has been given to the idea of formulating a "normal endemic index" for the larger municipalities of the State, based upon morbidity records for each of the more important diseases for a period of several years. After due consideration it is felt that the use of such an index would be impractical and misleading, and even less satisfactory than the present arbitrary method.

Local health activities

Local health officers are required by Reg. 7, Chap. VII of the Sanitary Code to file monthly reports with the Department. At present the custody and consideration of these reports rests with this Division. An effort is made, through a series of form letters and other correspondence, to follow up delinquencies. This has been particularly difficult during 1917 owing to frequent and sudden changes in the personnel and the fact that in many instances, health officers are carrying on work formerly divided among two or three practitioners, in addition to their official duties.

In the past, although the Sanitary Code does not exempt city health officers, reports have not been required of them. It is planned to require such reports, but to provide a special form which can be used also for monthly reports to local departments or officials, a copy being sent to this office. The preparation of such

a form will be deferred, however, pending an opportunity for discussion at a conference of city health officers.

During the year a score sheet for health activities in cities, begun by Dr. Meader, has been completed.

SCORE OF HEALTH ACTIVITIES IN CITIES OF NEW YORK STATE

TOTAL PERFECT SCORE 1000

	Perfect score	Allowed
COMMUNICABLE DISEASES		
1 TUBERCULOSIS		
(a) Cases reported promptly and immediate action taken	15	
(b) Hospital facilities (city or county). As many beds as annual deaths from tuberculosis	15	
(c) Nurse, full time for tuberculosis work in cities of over 25,000 population and one for each 100,000 population	20	
(In cities of less than 25,000 population full credit for c if public health nurse gives one-third time to tuberculosis work)		
(d) Dispensary one in every city of 35,000 and one for each 100,000 population	10	
Total	60	
2 OTHER THAN TUBERCULOSIS		
(a) Cases promptly reported and immediate action taken	10	
(b) Efficient investigation and control of cases	20	
(c) Systematic and effective cooperation between health and school authorities	10	
(d) Hospitals or wards for communicable diseases	20	
One bed for each 2000 population, allowed 20		
One bed for each 6000 population, allowed 10		
(e) Nurses — one nurse full time for communicable diseases for each 25,000 population	20	
(In cities of less than 25,000 population full credit if public health nurse is giving one-third time to communicable disease work)		
Total	80	
3 LABORATORY FACILITIES, LOCAL OR STATE, fully utilized for	80	
Bacterial examination		
Water, 5		
Milk, 10		
Diagnostic service		
Diphtheria, 5		
Typhoid fever, 5		
Tuberculosis, 5		
Pneumonia, 5		
Venereal diseases, 10		
Miscellaneous, 5		

	Perfect score	Allowed
3 LABORATORY FACILITIES, ETC.—continued		
Distribution, therapeutic outfits:		
Antitoxins, diphtheria and tetanus, 10		
Serums, antimeningococcus, antipneumococcus, 5		
Vaccines:		
Typhoid, pertussis, smallpox, rabies, silver nitrate solution (ophthalmia neonatorum), 10		
Miscellaneous, 5		
Local laboratory (approved by State Health Commissioner)	10	
Total	90	
4 MEDICAL INSPECTION OF SCHOOL CHILDREN		
(a) Physician (full time, 1 to 6000 children or equivalent) (half time, allow 8; less than half time in proportion)	15	
(b) Nurse (full time, 1 to 3000 children, or equivalent)	25	
Nurse (full time, 1 to 6000 children, or part time, 1 to 3000 children, allow 15)		
(c) Effective "follow up" system	10	
(d) Provision for isolation of sick children before each daily assembly of school	10	
(e) Medical clinic, including care of eye, ear, nose and throat, teeth, orthopedic work, etc	15	
(f) Open air school, special provision for crippled children, mental defectives or other like activity	10	
Total	85	
5 INFANT AND MATERNAL WELFARE WORK		
(a) Infant welfare station for each 25,000 people	35	
(b) Nurse, full time, each station	20	
(c) Physician in charge	15	
Cities under 25,000 population, full credit for a, b and c if public health nurse gives one-third time to infant and maternal welfare work		
(d) Little Mothers' League, one for each 25,000 population	10	
(e) Day nursery	10	
Total	90	
6 MILK AND FOOD INSPECTION		
(a) One full-time inspector for each 150 dairies (proportional time for less than 150 dairies)	20	
(b) One inspector is a veterinarian	5	
(c) Inspections made quarterly (semi-annually, allow 5)	10	
(d) All milk, certified, or Grade A,		
or		
Certified with Grades A and B, bottled and pasteurized	25	
Grade B, bottled and pasteurized, allow 20		
Grade B, bottled and not pasteurized, allow 10		
(e) Regular inspection of meat and other foods	15	
(f) All foods exposed for sale adequately protected from dust and flies	5	
Total	80	

	Perfect score	Allowed
7 WATER SUPPLY		
(a) Supply ample		
From springs and wells not subject to pollution	60	
or		
Any proper source with *efficient* filtration and chlorination		
Any proper source with efficient filtration or chlorination, allow 20		
(b) No auxiliary pipe lines from source open to pollution (for temporary use)	15	
(c) Adequate patrol and protection of watershed	15	
Total	90	
8 SEWAGE, GARBAGE AND MANURE		
(a) Sewage	40	
City completely sewered, allow 20; one-half sewered, allow 10		
No outside privies or cesspools, allow 10		
Sewage treated so that bacterial content is reduced 95 per cent, allow 10		
Sewage treated so that bacterial content is reduced 75 per cent, allow 5		
(b) Garbage	20	
Collection		
Efficient		
(1) Municipal, allow 12		
(2) Licensed collectors, allow 8		
Disposal		
(By reduction, incineration, burial or piggery)		
Efficient		
(3) Municipal, allow 8		
(4) Private, allow 4		
(c) Manure	20	
Collection weekly during summer months and fly breeding prevented by use of insecticides or otherwise		
Total	80	
9 RECORD KEEPING		
(a) Ample stenographic and clerical force	20	
(b) Efficient system of records (for statistical purposes)	25	
(c) System of recording or charting so that the following special information is immediately available	20	
1 Number and location of cases of communicable diseases		
2 The establishment and termination of quarantine		
3 The location of cases on milk routes		
4 The number of secondary cases		
5 Complete record of complaints of nuisances received and action taken		
(d) Effective measures in use to insure complete registration of births and deaths	25	
otal	90	

		Perfect score	Allowed
10	PUBLIC HEALTH EDUCATION		
	(a) Distribution of public health literature	15	
	1 Homes of newborn		
	2 Infant welfare stations		
	3 Through organizations and meetings		
	4 Homes of cases of communicable diseases, etc.		
	(b) Public health lectures (12) annually under lay or Health Department auspices	15	
	(c) Exhibits (2)	10	
	(d) Public health newspaper article of local interest weekly	15	
	(e) At least one newspaper actively cooperating with Health Department	20	
	(f) At least one lay organization cooperating with Health Department	15	
	(g) Clean-up week campaign or other equivalent educational activity	10	
	Total	100	
11	APPROPRIATION FOR PUBLIC HEALTH FUND	100	
	50 cents per capita or over, allow 100		
	Allow 2 points for each cent per capita appropriated below 50 cents		
	Total	100	
12	EFFICIENT ENFORCEMENT OF REGULATIONS RELATIVE TO BARBER SHOPS, COMMON TOWELS AND DRINKING AND EATING UTENSILS	20	
	Total	20	
13	SPECIAL PUBLIC HEALTH WORK OF VALUE ALONG NEW OR UNUSUAL LINES OR SPECIALLY EFFICIENT AND UNUSUAL RESULTS WITH OLD METHODS ADD POINTS UP TO	35	
	(Example:— Control of venereal diseases; hospital facilities; dispensary; effective follow-up system)		
	Total	35	

City..... Date.....

....

Health Officer Sanitary Supervisor

Copies of the score cards have been sent to the sanitary supervisors, with the request that scores be made by city health officers and their sanitary supervisors, acting jointly.

While the score system is still experimental and while without doubt its continued application will result in desirable changes being suggested, the interest it has already aroused indicates that it will have a marked influence in stimulating local health activities in New York State cities.

Communicable diseases

GENERAL ACTIVITIES

On March 13, Dr. Meader, Director of the Division, addressed the Women's Club of Sidney on "Simple Methods of Controlling Communicable Diseases." On April 1 and 15 he attended meetings in New York City of a committee, of which he was a member, appointed by the American Public Health Association to formulate minimum measures for the control of communicable diseases. A report of this committee was adopted by the American Public Health Association at its meeting at Washington in October. On April 20, Dr. Meader attended a meeting of the American Statistical Association held in New York city. At this meeting changes to be suggested in the 1920 Census were discussed. On April 24 he presented a paper on "Diphtheria in New York State" at the meeting of the State Medical Society, at Utica. On April 27 he attended a meeting called by the Surgeon General of the Public Health Service for the discussion of public health problems. On June 1 the present acting Director assumed charge of the Division.

In October the acting Director attended the meeting of the American Public Health Association at Washington. On December 11 he addressed the Chautauqua County Medical Society, at Jamestown, on "The Control of Venereal Disease."

During the year certain of the Department's communicable disease circulars have been revised and a new circular, a copy of which follows, has been prepared upon epidemic cerebrospinal meningitis.

EPIDEMIC CEREBROSPINAL MENINGITIS

General statement

Epidemic cerebrospinal meningitis is an acute communicable disease characterized by inflammation of the meninges (covering membranes) of the brain and spinal cord. The organism which is the inciting agent of the disease, the meningococcus, enters the brain and spinal cord through the nose and throat. It is usually present in the secretions of the nose and throat of those suffering from the disease or recently recovered from it and frequently in the nose and throat of those who have been in contact with cases. It is present in the spinal fluid of those who have the disease, and is discovered upon microscopical examination of specimens of spinal fluid withdrawn by lumbar puncture.

A person who has been closely associated with one ill with the disease may acquire the germs in his own nose and throat without himself contracting the disease, thereby becoming a "carrier." It is possible for one to become a carrier from contact with another carrier.

The disease is communicated from one person to another through transfer of the discharges from the nose and throat of cases and carriers. The carrier, if undiscovered, continues to mingle with others as usual, and for this reason is a greater source of danger than one who is actually ill.

Children are most susceptible to infection, resistance increasing gradually up to middle life. Adults are equally liable to become carriers.

Overcrowding or close contact greatly favors the spread of epidemic meningitis, owing to the greater likelihood of the transfer of secretions from one person to another under these conditions. On this account it is apt to be prevalent in military camps, where men are brought together in large numbers from widely separated localities, in some of which the disease prevails.

The disease is treated by the injection of antimeningococcus serum which is most effective when administered early, and becomes less effective with each day's delay. In most cases an early diagnosis can be made only through examination of the spinal fluid. An excessive amount of fluid is frequently present, and the mere withdrawal of fluid may give immediate temporary relief from severe headache or other so-called pressure symptoms. If the attending physician suggests lumbar puncture, therefore, this should be done promptly.

Diagnosis and treatment

The onset of cerebrospinal meningitis may be gradual or abrupt depending upon the virulence of the infective agent. Severe headache, associated with an elevation of temperature, is usually present. Frequently early in the disease an eruption appears. Vomiting, rigidity, and pain in the neck, retraction of the head, stupor or delirium, or Kernig's sign, are common. The pulse is apt to be relatively slow and in the later stages irregular while the pupils may be dilated after the first stage. Muscular twitchings or rigidity, convulsions, strabismus, and paralysis of facial muscles are among the symptoms which may appear.

Diagnosis is usually difficult and at times impossible without resort to laboratory aid. Meningeal symptoms associated with epidemic poliomyelitis

or other acute infections, tubercular and, rarely, syphilitic meningitis, have to be differentiated. Diagnosis may usually be determined by examination of spinal fluid, that of epidemic meningitis being as a rule, cloudy or purulent and microscopical examination revealing the presence of polymorphonuclear leukocytes and of meningococci. It occasionally happens that the fluid is found to be clear or that the presence of meningococci cannot be demonstrated. Under these conditions when epidemic meningitis is prevailing, if prominent symptoms of meningitis are present, and meningococci can be demonstrated in the nasopharyngeal secretions, diagnosis of this disease is justified.

Two principal types of meningococci, with a number of intermediate types, have been distinguished, the same type invariably existing in the nasal secretions and spinal fluid of the patient, when present in both.

When lumbar puncture reveals a turbid fluid, this should be regarded as presumptive evidence of meningococcus infection, and serum should be administered at once, if available, preferably without withdrawing the needle. If microscopic examination subsequently shows that the condition is due to other pathogenic organisms no harm will have been done to the patient. The usual dose is 30 c. c. for adults and corresponding amounts for children.

Following the first dose, two or more successive doses should be administered at 24-hour intervals, irrespective of apparent favorable results from the first doses. A case of moderate severity will require from four to six doses. If of marked severity, or if the case has come under treatment late, serum should be given at 12-hour intervals, up to six to ten doses. In exceptional cases, doses of 40 c. c. or even 60 c. c. may be given. Administration of serum should usually continue until temperature has been normal for at least two days, to avoid relapse.

Withdrawal of spinal fluid should always precede injection of serum. It is advisable to remove a volume of fluid from 2 c. c. to 5 c. c. greater than that of serum injected. In sensitive patients it may be advisable to resort to local anesthesia and in special instances among adults, general anesthesia may be justifiable. Fluid withdrawn should be received in a sterile container and subjected to microscopical examination.

Lumbar puncture should be performed under strictly aseptic precautions, with the patient upon his side, and the back arched. The notch nearest a line connecting the crest of the ilia should be selected, the needle being introduced in the midline and pushed forward and a little upward. Fluid should be allowed to flow until only three or four drops come in a minute. Serum, warmed to body temperature, should then be introduced slowly by gravity, using a funnel or the barrel of a syringe. A sterilized rubber tube, long enough to permit the funnel to be raised twelve inches, should connect the funnel with the needle.

The injection of horse serum into the meninges is always followed by a transient leukocytosis. Considerable reaction with increased temperature, and turbidity of the spinal fluid may occur immediately following injection. This should not occasion anxiety as the ultimate result is a decided clearing of turbid and even purulent fluids, and, as a rule, improvement in the patient's condition.

In from one-third to one-half of the cases treated with serum, on the eighth to tenth day symptoms of "serum disease"— fever, skin eruptions,

pain in the joints, digestive disturbances, etc., appear. Under these conditions reinjection of serum should be avoided if possible. In the event of relapse, with recurring turbidity of the spinal fluid, serum in most instances should again be administered.

Preventive measures

During an outbreak most of those who develop the disease are carriers for varying periods before becoming ill. Success in controlling an outbreak depends upon detection and control of all contact carriers. The meningococcus may be readily identified if cultures from the nose and throat can be prepared upon special media and delivered immediately to a laboratory equipped for the purpose. If cultures are delayed in transmission to the laboratory, the results will be uncertain and dangerous carriers may be missed. Specific vaccines have proved of doubtful value as a preventive. In the event of a threatened outbreak, the local health officer should immediately communicate by telephone or telegraph with the sanitary supervisor of his district or the State Department of Health. If the occasion demands, the Department's epidemiological force will be placed at his disposal.

Specific duties of the health officer

1 Isolate suspected cases pending diagnosis.

2 Immediately isolate each case. Remove to an isolation hospital if conditions permit.

3 If isolated upon the premises, post a communicable disease placard near the entrance to the house or apartment.

4 Report immediately to the State Department of Health by card and if upon a dairy farm, also by telephone or telegraph.

5 If necessary laboratory facilities are at hand, arrange to have cultures made from the nasopharyngeal secretions of those who have been in contact with the patient and isolate all showing positive cultures. Contacts with negative cultures may be released but should be kept under observation for at least two weeks.

5a The report of an examination showing meningococci in the secretions should be confirmed by sending subcultures to the State Laboratory in Albany.

6 If in doubt as to what course to pursue, communicate immediately by telephone or telegraph with the sanitary supervisor of your district or the State Department of Health.

7 Notify every family or individual in the house of the existence of the disease, and supply each with circulars of instructions. See that those who come in contact with the patient *receive and understand detailed instructions* regarding the destruction or disposal of articles soiled with nasopharyngeal secretions; methods of disinfection in connection with the care of the patient, and conditions of quarantine.

8 As soon as a diagnosis is made, see that a supply of antimeningococcus serum is secured. An emergency supply may be obtained from the following: The State Laboratory, 278 Yates street, Albany, N. Y.; Steuben County Laboratory, Corning, N. Y.; Laboratory, City Depart-

ment of Health, Jamestown, N. Y.; Warren County Laboratory, Glens Falls, N. Y.; Ontario County Laboratory, Canandaigua, N. Y.; Bureau of Health Laboratory, Syracuse, N. Y.; Madison County Laboratory, Oneida, N. Y.; Genesee County Laboratory, Batavia, N. Y.; Buffalo Health Department, Buffalo, N. Y.; Christiance-Dudley Pharmacy, Ithaca, N. Y.; City Health Bureau, Newburgh, N. Y.; City Laboratory, Poughkeepsie, N. Y.; Saranac Laboratory, Saranac Lake, N. Y. As the supply at these stations is limited, when a positive bacteriological diagnosis has been made, telegraph for a fresh supply to Dr. W. C. Noble, Branch Laboratory, 338 East 26th street, New York City.

9 Adults should be permitted to enter and leave quarantined premises only when there is no contact with patient or attendants, and when positive that they will neither handle foods nor come in contact with children.

10 Prohibit public funerals. (As noted under Reg. 53, Chap. II, the object of this regulation is to prevent spread of the disease by carriers.)

11 Use all diligence to discover unreported cases.

Recently, new rules and regulations for the control of typhoid and diphtheria carriers have been prepared and approved. Copies of each follow.

TYPHOID CARRIERS

The persistence of typhoid bacilli in the intestinal discharges and urine of persons recently recovered from typhoid fever is not unusual and does not necessarily denote a carrier state. Only in those cases in which the organisms do not disappear from the discharges after twelve weeks may a chronic carrier condition be said to exist. The number of chronic carriers is not accurately known but is greater than usually supposed.

The carrier state not only follows recognized cases of typhoid fever but may result from those which, because of the unusual mildness of the symptoms, have not been recognized as typhoid. In a small percentage of cases no history of the occurrence of typhoid fever is obtainable. In this way nurses attending typhoid fever have become carriers. Chronic carriers may continue to discharge the bacilli for many years.

The elimination of typhoid bacilli from the intestinal and urinary tract is intermittent, rather than constant. The bacilli enter the intestine usually from the gall bladder and gall ducts, the seat of typhoidal inflammation. When a typhoidal cystitis exists, the organisms appear in the urine. A rarer condition resulting in the discharge of typhoid bacilli is post-typhoidal suppuration of bones, commonly at the junction of cartilaginous and osseous tissues and most often about the ribs, leading to the formation of discharging sinuses which may persist for long periods.

The treatment of typhoid carriers is perplexing and often unsatisfactory, and no treatment applicable to all cases has been discovered. Infection of the urinary bladder can frequently be suppressed by the administration of hexamethylamin. Discharging sinuses may be cured by appropriate surgical treatment. When the gall bladder alone is infected, surgical drainage or

extirpation removes the source of intestinal contamination. But when the infection exists in the biliary ducts within the liver, the condition can not be reached by surgical methods, and no reliable therapeutic measures for its suppression are known at the present time.

Specimens of excreta to be forwarded to the State Laboratory for examination should be placed in the special containers provided for this purpose. Use the sterile swab enclosed in the tube for collecting the specimen, placing enough material upon the swab to avoid drying in transit. Every effort should be made to reduce delay in transmitting specimens to the laboratory to a minimum. Typhoid bacilli present in intestinal discharges diminish in number rapidly, a delay of 24 hours meaning, on the average, a loss of ten per cent in the number of organisms present.

Many important outbreaks of typhoid fever have been traced to carriers engaged in handling milk or other foods consumed by others. In two well-known instances domestics employed in one family after another have been responsible for the occurrence of cases in practically every family in which they have been employed.

A person of intelligence who is a carrier of typhoid bacilli, but who is willing to observe strictly certain essential precautions, may live and mingle with others and still need not be a source of danger to those about him. In formulating rules and regulations to be observed by carriers, the State Department of Health endeavors to restrict the activities of such persons to the smallest degree consistent with the protection of public health. By observing the following rules strictly, the carrier will not only avoid becoming a source of danger to those about him, but will be rendering a public service.

Rules and regulations for control of typhoid carriers

1 A typhoid carrier is a person who harbors typhoid bacilli and emits them, regularly or intermittently. This condition may or may not follow a recognized attack of typhoid fever. A person continuing to discharge typhoid bacilli following an attack of typhoid fever, shall be regarded as a case, rather than a carrier, for a period of at least twelve weeks following subsidence of clinical symptoms. After that period, the Health Officer may, in his discretion, declare such person to be a carrier.

2 The Health Officer, upon the discovery of a typhoid carrier, shall immediately report the fact to the State Department of Health, giving the full name, age, occupation, and address of such carrier (together with any other information relative to possible or probable infection of others), and shall also communicate the fact to the carrier himself or his guardian, imparting to him detailed information regarding the precautions to be observed in disposing of his discharges, in preventing contamination of his hands, and thus protecting others from infection. Instruction given by the Health Officer should include a copy of these rules and regulations and directions to wash the hands thoroughly with soap and water immediately after using the toilet and to use individual towels and drinking and eating utensils, which should be thoroughly cleansed, preferably by boiling, before being used by others.

3 When an outside toilet is used regularly by a typhoid carrier, it shall be equipped with a watertight container so screened as to exclude flies, and the removal of the contents for disposal should be in accordance with instructions given by the Health Officer.

4 No typhoid carrier may engage in any occupation involving the handling of milk or other food product to be consumed by others. Should a typhoid carrier be discovered upon a dairy farm, the Health Officer may prohibit the sale of milk, cream, or butter, except under conditions stated in regulation 37, Chapter II, of the Sanitary Code.

5 No typhoid carrier shall permanently leave the community in which he resides without notification to the Health Officer, who is to be informed of his destination, including his new address. The Health Officer should immediately notify the State Department of Health of the change of address.

6 The local Health Officer shall visit each typhoid carrier within his jurisdiction at least once monthly in order to determine whether instructions are being complied with; and once in each quarter shall render a report regarding each such carrier to the State Department of Health upon a form prescribed for the purpose.

7 The Health Officer shall cause samples of the discharges from each carrier to be examined bacteriologically at intervals at a laboratory approved by the State Department of Health, and a carrier may be regarded as recovered and be discharged from observation when four successive samples, taken not less than seven days apart, shall have been found not to contain typhoid bacilli; except that no negative report shall be considered if the specimen has been delayed in transit, and in no instance if more than two days have elapsed between the collection of the specimen and its examination.

DIPHTHERIA CARRIERS

The persistence of diphtheria bacilli for a time in the throats and noses of persons recovering from diphtheria is not unusual, and does not denote a carrier state unless the organisms persist for several weeks. Carriers are not infrequently discovered who have apparently become such through contact with cases or with other carriers ("contact" carriers), although a searching inquiry may reveal the fact that they have actually suffered from mild attacks of the disease. Abnormal conditions in the mucous membranes of the nose and throat appear to be largely responsible for persistence of diphtheria bacilli. Persistent carriers usually are immune to infection and give negative Schick tests.

According to laboratory records approximately 95 per cent of cultures from recovered cases and contact carriers tested for virulence up to three months from date of onset have shown virulence. In view of this fact, and since the virulence test is one consuming several days, requests for such tests should not ordinarily be made within this period.

In making cultures from large numbers of individuals, as in schools or institutions in which there have been no cases of diphtheria, organisms will be found in about one or two per cent which closely resemble diphtheria bacilli, but which do not cause diphtheria or produce toxin. They can be distinguished from true diphtheria bacilli only by means of virulence tests

upon animals. Cultures from such non-contact carriers may be submitted for virulence tests immediately.

When diphtheria is prevailing, if carriers are discovered who give no history of direct contact with a case or a carrier of diphtheria bacilli, virulence tests will be made immediately upon receipt of a detailed statement of the facts from the Health Officer. When a Health Officer feels that there are extraordinary and urgent reasons for requesting virulence tests upon cultures from a recovered case or contact carrier, he should take the matter up with his sanitary supervisor, or with the Director of the Division of Communicable Diseases.

The control of convalescent and contact carriers is an important factor in the prevention of the spread of diphtheria. It should be borne in mind that organisms from mild cases, perhaps simulating tonsilitis, may be highly virulent for other persons.

Treatment

The treatment recommended for diphtheria carriers is general and local in character. The general treatment consists of fresh air and exercise, sunlight, simple and nourishing diet, and painstaking habits of personal hygiene. In a majority of instances the carrier condition will ultimately yield without other treatment; indeed, in many, without any treatment. Local treatment consists of the correction of abnormalities of the mucous membrane of the nose and throat and topical applications.

Whenever topical applications are selected, it should be clearly borne in mind that, to be effective, they must be used thoroughly, systematically and continually, often for a long time, and without at any time irritating the mucous membrane. Frequent, continued and thorough cleansing of the mucous membranes will accomplish more than anything else except operative treatment for the removal of focal points of inflammation.

Numerous methods of local treatment have been suggested, all of which have apparently been used with some success in limited numbers of cases, but none of which can be recommended for general application. The following formula has been suggested for an antiseptic wash (Wadsworth; Journal of Infectious Diseases, Vol. 3, 1906, P. 793):

Sodium chloride ℥ ss
Sodium bicarbonate gr. x
Water ℥ ii
Glycerine ℥ i
Alcohol ℥ v
Thymol
Menthol aa gr. i
Oil wintergreen gtt. iii
Oil cinnamon gtt. ii
Oil eucalyptus gtt. v
Tr. Cudbear ℥ ss

For use in mouth and throat dilute with water one to two parts, in the nares four to five parts.

NOTE.—When made in quantity the taste improves on standing. The salts should first be dissolved in water before adding alcohol. Precipitates are harmless but may be removed by decanting or filtration.

The following solution is somewhat less pleasant to taste but equally effective:

Alcohol	20 per cent.
Glycerine	10 per cent.
Water	70 per cent.

For use in the nares, dilute with water, equal parts or more.

A 2 per cent solution of dichloramin-T in chlorinated eucalyptol, sprayed into the nose and throat four or five times daily, has also been recommended.

Rules and regulations for control of diphtheria carriers

1 A diphtheria carrier is a person who harbors in the secretions of his nose or throat the bacillus of diphtheria, either following recovery from diphtheria or without himself having contracted the disease. A person who still harbors the bacilli as a result of a recent diphtheria infection shall be regarded as a case of the disease, and not as a carrier, until at least five weeks have elapsed after the date of the first release culture. After that time, the Health Officer may, at his discretion, regard such a person as a carrier rather than as a case.

2 The local Health Officer, upon the discovery of the carrier condition shall immediately advise the carrier or his guardians of the condition and give him detailed instructions regarding the precautions to be observed in the disposal of the secretions of the nose and mouth and in his associations with other persons. If the carrier is a child attending school, the Health Officer shall immediately notify the medical school inspector, superintendent, or principal of the school, who shall immediately exclude him from the school.

3 A diphtheria carrier shall not leave the premises upon which he resides except under permission from the Health Officer, who shall issue such permission only for urgent reasons and when he is assured that necessary precautions will be taken for the protection of others. But no diphtheria carrier may be granted permission to attend church, Sunday school, moving picture shows, or other places of public assemblage; and he may be permitted to attend school only when, because of the existence of numerous carriers following an outbreak of diphtheria, classes are conducted in separate rooms and the children who are carriers are prevented from mingling with other children.

4 Without permission from the Health Officer the premises occupied by a diphtheria carrier shall not be visited by children not residing there. When on such premises there are children other than the carrier, who are attending school or Sunday school, the Health Officer shall immediately have cultures taken from their noses and throats for examination; and when any such children are discovered to be free of diphtheria bacilli, they are to be kept apart from the carrier and not permitted to use the same eating utensils, toilet articles, etc., used by the carrier. Pending the report upon the cultures, all such children shall be excluded from school.

5 No diphtheria carrier shall engage in any occupation involving the handling of milk or other food to be consumed by others, except that, if a housewife, she may, with the permission of the Health Officer, continue to prepare food for the family or household, provided each member of the same

has been shown, by means of the Schick test, to be immune to diphtheria. Should the carrier reside or be employed upon a farm producing milk for sale, the Health Officer may prohibit the sale of the milk, cream, butter, or cheese from such farm, except as provided in Reg. 37, Chap. II, of the Sanitary Code.

6 When a virulence test upon a culture from a diphtheria carrier has shown the organisms not to be virulent for guinea pigs, the imposed restrictions may be removed by the Health Officer.

7 A diphtheria carrier may be regarded as free of the bacilli and be discharged from observation and restraint when two negative cultures, taken at intervals of not less than 24 hours, have been obtained.

8 Should a diphtheria carrier be unable or unwilling to observe the precautions herein indicated, the Health Officer may take such further action as may be necessary to safeguard public health, pursuant to sections 25 and 326-a of the Public Health Law.

A chart presenting rules and regulations, approved by the Departments of Education and Health, for the exclusion of school children exposed to communicable diseases, has been revised and made to include poliomyelitis.

A large amount of necessary correspondence has been carried on during the year, an approximate average of 90 letters weekly, exclusive of form and circular communications, having been prepared and sent out.

During the latter part of the year, owing to the fact that the newly appointed Supervisor of Tuberculosis has been stationed in New York City, the records of tuberculosis have been in the custody of, and correspondence incidental thereto has been carried on by the Acting Director.

In available time the writer has undertaken a study of conditions in the office, relative to the distribution of work among the employees of the Division, with a view to eliminating unnecessary procedures, and increasing efficiency. Something has been accomplished in this direction.

We have referred, in discussing the activities of sanitary supervisors, to the problem of keeping supervisors informed as to the prevalence of communicable diseases in their districts. It is equally necessary that the Director of the Division be kept constantly informed as to prevalence throughout the State. After trying more or less intricate methods the writer devised the simple card shown herewith.

SEPTEMBER, 1917

Broome County		July	Aug.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Binghamton	Diph																																	
	Scar. F																																	
	Typh																																	
	Ep. C. S. M																																	
	S. S. Throat																																	
Union, Endicott & Johnson City	Diph																																	
	Scar																																	
	Typh																																	
	Ep. C. S. M																																	
	S. S. Throat																																	
Rest of Co.																																		

Reports received each morning from health officers are entered upon the proper cards, which are then placed upon the Director's desk and examined by him daily. When he notes an unusual prevalence of a disease in any municipality a red "X" is placed opposite the figures indicating reported cases, a clerk prepares a postcard notice to be sent to the sanitary supervisor of the district (illustration, page 117) placing a circle about the check mark to indicate that the notice has been sent.

Late in the year a request was received from a city official in another state for information regarding communicable disease isolation hospitals. Detailed information was not available and, through the sanitary supervisors, a survey of the cities of the state was begun. An abstract of the information thus obtained is presented below:

ISOLATION HOSPITALS IN CITIES (50,000 POPULATION OR UNDER) OF NEW YORK STATE

	Population	Facilities
Amsterdam	34,319	Five rooms (separate), 1 small ward (4 beds), 1 large pavilion, not commonly used; accommodates 22.
Batavia	13,278	Smallpox and contagious disease cottage in conjunction with the Batavia hospital.
Binghamton	53,668	Pavilion, 20 beds; connection with city hospital. Nursing staff supplied by City hospital.
Cortland	12,367	Temporary hospital.
Canandaigua	7,501	Annex to the Memorial hospital; accommodates at least ten.
Elmira	40,093	Emergency pavilion.
Hornell	14,352	Emergency pavilion.
Jamestown	37,780	
Middletown	16,381	Four rooms; eight patients might be accommodated.
Niagara Falls	42,257	Isolation hospital; capacity about thirty beds.
Norwich	8,342	Isolation hospital; remodeled dwelling accommodates 12. Separate residence for caretaker. Kept heated. Nurses secured through arrangement with Norwich hospital.
Ogdensburg	14,338	St. John's hospital; capacity about thirty-five beds.
Olean	17,925	Emergency.
Rome	21,926	Building originally intended for smallpox.
Saratoga Springs	13,792	Isolation hospital equipped for 8 beds. Will accommodate 15 patients.
Watertown	26,895	Communicable disease hospital (Bide-a-Wee Home); accommodates 14. Additional emergency hospital for 6 cases.

During the year the Public Health Council has enacted a number of amendments and additions to the regulations of the Sanitary Code relating to communicable diseases (see Public Health Council report, pp. 35-91). Perhaps the most important and far reaching in their effect were those relative to the venereal diseases.

Hospital for Contagious Diseases, Amsterdam, N. Y.

One of these made it a duty of physicians attending cases of gonorrhea, syphilis or chancroid to furnish the patient with copies of a circular of instructions issued or approved by the State Commissioner of Health. To meet the demand thus created, a circular was prepared, the text of which follows:

VENEREAL DISEASES

Duties of physicians in relation to venereal diseases

The duties of physicians in relation to venereal diseases are set forth in the following regulation of the Sanitary Code:

Regulation 29-a Chancroid, gonorrhoea and syphilis. Chancroid, gonorrhoea and syphilis are hereby declared to be infectious diseases highly dangerous to the public health.

It shall be the duty of every physician, when first attending a person affected with chancroid, gonorrhoea or syphilis to furnish said person with a circular of information issued or approved by the State Commissioner of Health and to instruct such person as to the precautions to be taken in order to prevent the communication of the disease to others.

In the event of failure of persons suffering from venereal diseases to observe the necessary precautions, health officers are now provided with ample power to take such action as will safeguard the community.

Venereal diseases in relation to marriage

Under an amendment to the Domestic Relations Law, in effect May 16, 1917, no marriage license may be issued until the applicant shall have subscribed to the following statement:

"I have not to my knowledge been infected with any venereal disease, or if I have been so infected within five years I have had a laboratory test within that period which shows that I am now free from infection from any such disease."

The purpose of this law is to prevent the transmission of venereal disease after marriage in cases where the infected person while apparently cured, and although free from all symptoms is not actually free from infection and is capable of communicating the disease. The laboratory examination of the blood as now provided by law is absolutely necessary to determine this question.

Instructions to those having gonorrhea

Gonorrhea is a serious infectious disease which, however, may be cured by proper treatment. Time and patience are required to permanently cure it. The infective agent may remain in the body for years after the discharge has disappeared. During this period it will be possible for you to give the disease to others. Therefore you must not marry or have any sexual relations until a reputable physician *after a laboratory test* has pronounced you cured. It is a very grave disease in women. It is often responsible for childless homes, invalidism and mutilating operations. If a mother has it, a baby may become blind or contract the disease.

For your protection and the protection of others, observe the following rules:

1 Wash your hands *thoroughly* after handling anything that may be soiled with the discharge. The pus contains millions of germs. A small drop carried to the eyes on your fingers may cause blindness in a few days.

2 Be clean. Do not let the discharge soil the toilet, wash basin, bath tub, etc.

3 Sleep alone.

4 Have no sexual intercourse. Avoid sexual excitement. It will aggravate your disease.

5 Allow no one else to use your toilet articles, particularly towels and wash cloths.

6 Burn all soiled cloths, cotton and gauze after use.

7 Never lend to anyone anything used in your treatment. Destroy such things when you are through with them.

8 Do not be discouraged. Continue treatment until a laboratory test shows that you are cured. This is absolutely required to determine this question.

9 If you can not afford to continue treatment, tell your physician, and he will refer you to a good clinic, or suggest some other provisions for treatment.

10 Never allow anyone except a reputable physician to prescribe for you. Follow his directions implicitly. Never use patent medicines or patronize advertising "specialists."

The laboratory examinations necessary for the diagnosis, supervision and determination of the freedom from infection are made without charge by the State Department of Health.

Instructions to those having syphilis

Syphilis is a germ disease which not only affects the skin, but if neglected, may attack any part of the body and destroy vital organs. If it attacks the brain and spinal cord, paralysis and insanity may follow. Sudden death may result from damage done to the heart and blood vessels.

But *it can be cured* if you are willing to continue the proper treatment long enough and will follow your physician's directions.

The mere fact that your present symptoms disappear and you feel well does not mean that you are cured. The disease germs may be present in the blood without producing any outward signs or symptoms. If uncured, it may strike you down suddenly after twenty years or more of apparently good health. Your physician will, after making the necessary laboratory tests, tell you when you may safely stop treatment. You should report to him for treatment and for laboratory tests for several years.

The disease is highly communicable and, without extreme care, you may give it to others. To protect yourself and others, including future generations, observe the following rules:

1 Be clean.

2 Sleep alone.

3 Have no sexual intercourse.

4 Have separate towels, brushes, soap, razors, etc., and never let anyone else use them.

5 Never permit anyone to use anything which may have been in your mouth, such as pipes, pencils and eating utensils.

6 If you go to a dentist, tell him about your disease *before he examines your teeth.*

7 Do not kiss anyone.

8 Always burn dressings that have been on sores.

9 Do not marry until you have been for a long time free from any symptoms but also are free from any blood infection as shown by a laboratory test. This is called the Wassermann test.

10 Avoid alcoholic drinks. Never use drinking utensils in public places.

11 Whenever in the future you consult a physician for any other complaint, tell him you have had syphilis.

12 Do not be discouraged. Stick to treatment until are *cured.*

13 If you can not afford to continue treatment, tell your physician and he will refer you to a good clinic or to the Department of Health.

14 Never allow anyone except a reputable physician to prescribe for you. Follow his directions explicitly. Shun patent medicines and advertising "specialists."

Chancroid

Chancroid, or "soft chancre," is a germ disease characterized by ulcerating sores on the affected parts, usually the genital organs. It is at times difficult to determine, without laboratory tests, whether a sore is a chancroid or the chancre of syphilis. A person having this condition should therefore continue under the observation of a reputable physician and submit to laboratory tests when necessary. The disease is infectious and may readily be given to others, at times with very serious results.

Laboratory aids to diagnosis and treatment

Reference has been made to certain "laboratory tests" which are absolutely necessary for an accurate diagnosis of your condition and to determine definitely when you are cured. These are:

1 An examination of the discharge to determine the presence of "gonococci," the germs of gonorrhea.

2 A blood test, called the "complement fixation" test, to determine whether gonorrheal infection is present in the blood.

3 Examination of material from a "sore" or chancre to determine the presence of the germ of syphilis. The "sore" is the point where the germs of syphilis first enter the body.

4 A blood test, called the Wassermann test, to determine the presence of syphilitic infection in the blood. Without this test, it is impossible to determine when the blood is free from infection and syphilis is cured.

While not abolutely necessary in all cases for the cure of syphilis, the use of salvarsan or its substitutes greatly expedites the recovery and for the complete and permanent cure of many cases it is indispensable.

Upon request from your physician, and without charge, he will be supplied with the outfits necessary for taking specimens, and tests will be made

at the State Laboratory at Albany or the branch laboratory at 338 East 26th street, New York City. When the tests have been made, he will immediately be informed as to the results.

In this connection the Legislature at its 1916–17 session amended the penal code by adding section 1142-a which follows:

§ 1142-a. Advertisements relating to certain diseases prohibited. Whoever publishes, delivers or distributes or causes to be published, delivered or distributed in any manner whatsoever an advertisement concerning a venereal disease, lost manhood, lost vitality, impotency, sexual weakness, seminal emissions, varicocele, self-abuse or excessive sexual indulgence and calling attention to a medicine, article or preparation that may be used therefor or to a person or persons from whom or an office or place at which information, treatment or advice relating to such disease, infirmity, habit or condition may be obtained, is guilty of a misdemeanor and upon conviction thereof shall be punished by imprisonment for not more than six months, or by a fine of not less than fifty dollars nor more than five hundred dollars, or by both such fine and imprisonment. * * *

The establishment during the year of a number of military cantonments in the State created new problems, one of which was that of the relation of local health officers and district sanitary supervisors to officers in charge of such cantonments, in so far as the control of communicable diseases was concerned. Health officers and supervisors were urged to cooperate in every way, and particularly to bring to the attention of the commanding officers any special prevalence of communicable disease in districts adjacent to camps. For the information of health officers the Department Bulletin for December 15 published the following:

Communicable disease reports from military encampments

The attention of health officers in whose districts military posts or encampments are located is called to Regulation 203, in the Manual of the Medical Department of the United States Army, which is as follows:

"203. The senior medical officer of a military post will promptly notify the local board of health, if there is one, of all cases of infectious disease occurring at the post of which such board would take cognizance were the same to occur in the community subject to its supervision."

It was suggested that health officers affected by the regulation cited, confer with the senior medical officers of such posts or

encampments and ask to have sent to them carbon copies of communicable disease reports filed by the medical officer with the commandant.

Prevalence of communicable diseases

General Comment

The control of communicable disease in the State, outside of New York City, has been particularly difficult during 1917, owing to the unsettled conditions and numerous changes in health officers incidental to the war. It is difficult to estimate to what extent the extensive and constant movement of troops from other states and from one part of the State to another has influenced the prevalence of these diseases, but it seems reasonable to assume that it has contributed in some degree to the prevalence of certain diseases — notably measles, German measles, and epidemic meningitis, all of which have prevailed in most of the military camps, the first two to a very great extent.

Among the common communicable diseases there have been increases in total numbers of cases recorded upstate, over 1916, in several, notably in chickenpox, German measles, scarlet fever, whooping cough, epidemic cerebrospinal meningitis and smallpox. The number of cases of diphtheria was larger by 53 than in 1916, although the case rate per hundred thousand population remains practically unchanged. There has been a slight decrease in the diphtheria death rate as compared with 1911–1915. Typhoid fever increased by 68 cases while there were 30 less cases of paratyphoid, the combined case rate remaining practically unchanged. On the other hand there has been a decrease in death rate for typhoid fever of approximately .3, with a decrease of approximately 4.9 or 46.7 per cent over the five-year period 1911–1915, inclusive. There were 312 more cases of bacillary dysentery recorded than in 1916.

In several of these diseases, increases have been to some extent apparent rather than real, and in typhoid fever there is every reason to believe that an actual decrease has occurred both over 1916 and the preceding five year period.

Local outbreaks of communicable disease are investigated from

time to time by sanitary supervisors, and of late, by epidemiologists. Not infrequently such investigations bring to light numerous undiscovered or unreported cases, which are, as a rule, enumerated in the special reports of the investigators. In the past, owing no doubt to the lack of technical assistance in the office of the Division and the pressure of administrative work, most of these cases have failed to make their appearance in the annual records. With the appointment of epidemiologists, one of whom has been available for service in this connection, reports of investigations have been studied much more carefully than was possible before, and many cases are included in our records for 1917 which otherwise would have been missed. This is true regarding scarlet fever and diphtheria, but applies particularly to typhoid fever and bacillary dysentery.

With reference to typhoid fever, the omission from the records of such cases occurring in one or two of the larger outbreaks alone would have brought the 1917 rate down to a point considerably below that for 1916. The decline in the death rate in itself would suggest that there have actually been less cases, but that a much larger percentage of existing cases have been recorded.

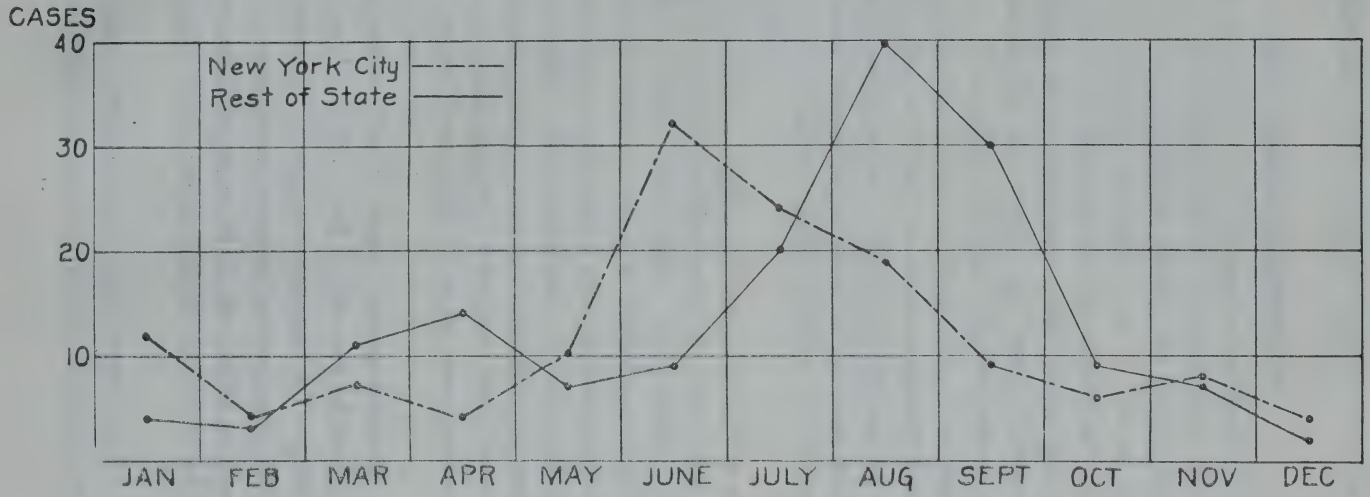
Referring to bacillary dysentery, in a special report of an investigation of one large epidemic in 1916, it is stated that 225 cases had occurred which were undoubtedly dysentery, yet to record for the year showed but 121 cases charged to the municipality. During 1917 a similar outbreak occurred in the same municipality, and all discovered cases are included in the total for the year.

During 1917 several outbreaks of intestinal disorder have been investigated, some of which, according to laboratory reports, have proven to be bacillary dysentery. Here, again, it is reasonable to assume that there are not actually more cases, but that the disease is receiving more attention and that a larger proportion of existing cases are reported.

In acute anterior poliomyelitis there has been a very marked decrease over 1916, both upstate and in New York City.

A decrease of 12,166 cases of measles upstate against an increase of 5,916 cases in New York City, gives a decrease of 6,250 for the State as a whole. Mumps decreased both upstate and in New

Chart 2



Incidence of Poliomyelitis, 1917

York City. There was a decrease of 1,854 in tuberculosis (all forms) for the State as a whole, with an increase of 24 upstate.

Acute anterior poliomyelitis

In view of the occurrence of an extensive epidemic of poliomyelitis in 1916, and the uncertainty as to what 1917 would bring forth, the incidence of the disease during the spring and summer was closely and constantly observed, and so far as practicable every reported case was investigated by a member of our field staff. Amendments to the Sanitary Code placed the maximum period of incubation at two weeks and made three weeks the minimum period of isolation. Health officers asking for advice were urged to isolate for the two-week period all contacts, including adults who were at all likely to come in contact with children or to handle foods, and to permit adults to enter and leave quarantined households only when the isolation of patients was complete, and the possibility of contact with children or of handling of foods was precluded.

The disease occurred in epidemic form during the summer in northern Vermont, and to a smaller extent in one or two Canadian counties adjacent to New York State. On account of the proximity of the officers' training camp at Plattsburg to the Vermont line, special restrictions were placed upon intercourse between the two states at this point. The prevalence of poliomyelitis in New York State, however, nowhere assumed epidemic proportions. The largest number of cases reported from any locality occurred in St. Lawrence County, from which 31 cases were reported between August 13 and November 16.

The following chart (No. 2) shows the incidence of the disease by months in New York City and in the rest of the State. New York City reported 139 cases, as compared with 9,009 in 1916, while upstate 156 cases were reported as compared with 4,214 in 1916. It will be noted that, as in 1916, the incidence curve reached its maximum height a few weeks earlier in New York City than upstate.

Aside from the prevalence of the disease in St. Lawrence county, where a number of cases occurred during the epidemic of

1916, there was nothing striking in regard to its distribution. The municipalities having the largest numbers of cases were Hudson (6), Buffalo (8), Rochester (5), Syracuse (3), Albany (4), and Troy (3). In all, the cases were scattered both as to dates of onset and localities.

New York City, with 139 cases in 1917, recorded 53 deaths, a case mortality of 38.1 per cent; in the rest of the State, with 156 cases and 41 deaths, the percentage is 26.2. It will be recalled that New York City, during the epidemic of 1916 had a case mortality of 27.2 per cent, while that for the rest of the State was 21.3 per cent. It is interesting to note the continuance of the higher case mortality in New York City.

The higher case mortality for 1917 as compared with 1916 may be accounted for, in part at least, upon the assumption that many cases were no doubt diagnosed in 1917 as poliomyelitis of the abortive type, and reported as such, which would have been otherwise diagnosed or overlooked in 1916.

Anthrax

Thirty-two cases of anthrax were reported during the year, 14 of these occurring outside of New York City. Of the 14 upstate cases 9 occurred in Broome County.

In April and May the writer, then Sanitary Supervisor of the district including Broome County, made an investigation of cases among employes of E. J. & Co., operating one of the largest shoe manufacturing plants in the State. A summary of our report upon the investigation follows:

According to information received from a representative of the company 16 cases have occured up to the date of investigation, among employes. It was stated that cases rarely if ever occurred until, after the beginning of the European war, it became necessary to buy Brazil hides and certain poorer grades of India hides. This representative was therefore of the opinion that Brazil and India hides were responsible for infection.

From January first to the time of investigation seven cases had occurred:

NAME	Onset	Employment just before infection
Evans	Jan. 5	Foreman, freight gang, at tanneries.
Bedner	Jan. 20	Oiling "kickers" sole leather tannery.
Overacher	Mar. 10	"Calf skin" tannery. Disinfecting freight car in which India hides were received.
Tchchuck	Mar. 28	"On the beam" sole leather tannery near "kickers."
Colego	April 6	Sole leather tannery "on the beam" often near "kickers."
Cook	April 30	Machinist, working on "kickers."
Polarasky	May 4	Unloading India hides from car.

It will be noted that all of the recent cases were among employes of the two tanneries, one designated as "calf skin", the other as the "sole leather" tannery. Only one was definitely employed in the calf skin building. He received his infection after leaving the employ of the company, as will presently appear. Four days before leaving he was engaged in disinfecting a car in which presumably infected India hides had been received.

About 6,000 hides go through the tanneries daily and about 38,000 weekly. All are secured through a buyer in New York City. They are received from Java, India, China and Brazil, the rest being spoken of as "New York" or domestic skins which are collected from the United States, Mexico and sections of South America other than Brazil. Most of the skins, with the exception of the "New York" or domestic, are baled at the place of shipment.

Generally speaking skins from various sources go through both tanneries regularly, heavy skins going to "sole leather" and the light to "calf skin." As a rule, Java skins go only to "calf skins" while India and China skins may go to either. On certain days, depending on shipments received, certain kinds predominate. Each is marked with a lot number which remains on the skin throughout the tanning process.

There are three general classes with reference to conditions in which they are received: "dry flint" hides are those which are sun-dried and hard; "dry salt" hides have been first dried and then salted; "green salt" hides are salted before drying.

Java skins are said to be usually clean and of a grade above the average. Many of the China and India hides are of a relatively poor quality. Most of the latter are from the small Indian

cow. Incidentally, it was stated that this cow is sacred and not often killed, the skins being presumably from animals that have died a "natural death."

An effort appears to have been made to disinfect China and India hides before shipment, and many of the holes and skins contained in them are covered with lime. It is customary for the buyer to notify the company when hides from anthrax infected districts are being shipped, in order that skins and freight cars may be disinfected upon arrival.

In the course of treatment, skins which are to be disinfected are held for three days in a vat containing solution of bichloride of mercury in the approximate strength of 1:1000. The general feeling was that this treatment would not affect anthrax spores. Other skins are first soaked in water. All are then transferred to containers called "kickers" through which water flows continuously and in which the skins are constantly agitated by mechanical arms, the object being to soften them. It was noted that the dirty looking liquid which resulted was, in every instance, being spattered in every direction, so that everything in the vicinity, including the parts of the machines themselves, were constantly soaked with it. Anyone passing through the narrow aisles between the "kickers" could scarcely avoid being spattered.

The subsequent treatment of the hides includes soaking in a lime mixture and a later washing with a solution containing ammonia.

Employes handling hides are required to wear gloves — canvas for handling dry hides and rubber for wet hides — and to wear armlets. We were told, however, that men who have been engaged at this work for some time become careless and in spite of instructions leave off their gloves or, perhaps, upon an impulse to scratch a wrist or arms, push the gloves or armlets aside. Men were noted handling wet hides with bare hands. That canvas gloves themselves become infected and are an indifferent protection is suggested by one of the case histories given below.

Briefly, the histories of cases investigated were as follows:

1. Evans; onset January 5; foreman of freight gang, and for two days before onset had been unloading a shipment of hides. By tracing car numbers, it was found that the cars contained China and "New York" hides.

2. Bedner; onset January 20; employed in sole leather tannery, and immediately before onset engaged in oiling "kickers."

3. Overacher; onset March 10; left the employ of the company temporarily on February 22 to work on a farm, taking with him his canvas gloves. For three days before leaving helped to unload 10 freight cars. By tracing car numbers it was found that all contained India hides shipped from Agros. On or about March 9 he was working out of doors, having on his canvas gloves. He had upon his face a pimple which by previous scratching had become abraded. He recalled rubbing this with his gloved hands. The next day evidences of infection appeared.

4. Tchehuck; onset March 28; worked "on the beam" in sole leather tannery, handling hides which had been through the lime vats. He had occasion frequently to pass back and forth near the "kickers."

5. Colego; onset April 6; employed in sole leather tannery, taking hides out of vats well along in tanning process. Had occasion to pass close to "kickers" frequently.

6. Cook; onset April 30; machinist, had been working upon "kickers."

7. Polarasky; onset May 4; had been away upon a vacation for a week, returning May 3d. Was put to work that day unloading a car of hides, which upon investigation proved to be India and "New York" hides.

From the foregoing the following conclusions were drawn:

(a) Hides infected with anthrax were received and handled frequently.

(b) A large proportion of those infected were from India and China.

(c) Infection was received through direct or indirect contact with hides just received or before they had passed through the lime vats, and the dissemination of infected liquid from the "kickers" was a source of danger.

(d) The use of canvas gloves in handling infected hides is not an effective protection.

The writer was accompanied and assisted in this investigation by Dr. Dudley, the company's physician at the tanneries. The Company was exceedingly anxious to discover and overcome defects and sources of danger.

Bacillary dysentery

During the year 479 cases were recorded in the State outside of New York city, which reported no cases (for general discussion, see p. 124), of these the greater number (349) occurred in Dutchess County, 315 of them in the city of Poughkeepsie.

The following is the detailed report of Dr. Edward H. Marsh, Sanitary Supervisor, upon the Poughkeepsie outbreak, as published in HEALTH NEWS for December, 1917:

AN EPIDEMIC OF BACILLARY DYSENTERY

During the summer of 1917 a widespread epidemic of bacillary dysentery again occurred in Poughkeepsie, N. Y. This disease has been recognized as being in existence in that city since 1914, when at one time every house on one of the streets near the waterfront contained a case of dysentery, according to one of the local physicians.

In the summer of 1916, 227 cases were reported with 49 deaths.* During the present epidemic, which started in the early part of July and spread rapidly throughout the western part of the city, there were 315 cases and only 13 deaths reported up to October 1. Only 10 cases had been reported to the health officer up to the first of August. A careful epidemiological survey was then made, with the result that 46 more cases were found, most of whom had had no medical attention and in which no precautionary measures against the spread of the disease had been taken. It is undoubtedly due to these missed cases that the epidemic assumed such large proportions. The first cases were reported to the health officer on July 12. The case incidence by weeks was as follows:

	Cases		Cases
Previous to July 12.....	7	August 23 to 29.....	39
July 12 to 18.....	10	August 30 to September 5...	32
July 19 to 25.....	12	September 6 to 11.....	18
July 26 to August 1.....	28	September 12 to 18.....	12
August 2 to 8.....	32	September 19 to 25.....	6
August 9 to 15.....	66	September 26 to October 1..	3
August 16 to 22.....	50		
		Total	315

Of these 315 cases, bacillus dysenteriae was isolated on one or more occasions from the stools of 47 persons. Four types of B. dysenteriae were found: (1) atypical Shiga, (2) Mt. Desert, (3) Flexner, (4) Strong. The Mt. Desert type predominated.

The symptomology of these 47 cases was quite variable. Onset was sudden in 41; gradual, lasting from one to four days, in 6. The disease was ushered in with chill in 16 cases. Diarrhea was present at the onset in 44 cases; three patients were constipated until relieved by catharsis. Of these, one again became constipated and at no other time had diarrhea. Vomiting occurred in 26 cases; nausea in 29; fever in 33; 23 complained of headache; 34 had abdominal pain, and 1 had intense pain in the back. Blood was passed by 28, and mucus by 22. Three of these 47 bacteriologically positive cases died.

The above record shows that we must change our conception of the symptomology of bacillary dysentery. We have been taught that there is a condition of prostration accompanied by copious, bloody stools and associated with a high mortality. Some epidemics, of course, have assumed this

* Smith, J. A.—N. Y. State Journal of Medicine, XVII, 9, p. 413.

picture, notably those which have occurred in some of the wars of the past century; but the medical profession must learn to recognize that bacillary dysentery may present itself as a mild disturbance of the gastrointestinal tract.

In this series of cases the diagnosis of bacillary dysentery was made in 315 of a total of 494 cases of intestinal disturbance. The diagnosis was determined in one of three ways: (1) positive bacteriological findings, (2) clinical picture and (3) epidemiological evidence. It is probable that a large number of the remaining 179 cases of diarrhea were bacillary dysentery, but according to the above classification could not be included as such.

Analyzing the symptoms of the total number of cases, sudden onset was found in 203, gradual in 20, and history of onset lacking in 92. There was initial chill in 60 and convulsion in 1; 135 suffered with fever, 96 with headache, 114 with nausea and 112 vomited. Abdominal pain was present in 178 cases, pain in the back in 1. Four were constipated at the onset; 311 had diarrhea; 112 passed blood and 73 passed mucus. The duration of illness varied from one day to seven weeks, as shown in the following table:

Duration of Illness

Cases	Duration	Cases	Duration
14	1 day	12	2 weeks
24	2 days	4	3 weeks
22	3 days	2	4 weeks
14	4 days	1	5 weeks
13	5 days	1	6 weeks
6	6 days	1	7 weeks
24	7 days	177	unknown

Age Incidence

Under one year	22	30–40 years	29
1–5 years	99	40–50 years	19
5–10 years	21	50–60 years	24
10–20 years	24	Over 60 years	24
20–30 years	45	Unknown	8

The conditions giving rise to the epidemic are numerous. (1) Bacillary dysentery has been endemic in this community for at least four years. We have records of 28 cases which occurred between November 1, 1916, and June 1, 1917. (2) Insanitary conditions of sewage disposal and other conditions which favored fly breeding. (3) Personal contact either in the street, at home, or at place of employment. (4) Mild cases which did not seek medical advice and hence received no instructions as to precautionary measures to be taken. This last factor was perhaps the greatest menace.

The disease occurred on 72 streets of the city, on 39 of which there were cases of bacillary dysentery in 1916. Analysis of the streets involved shows that 11.1 per cent of the streets contained 36.8 per cent of the cases. There were 199 houses invaded, of which 131 had single cases while 68 had more than one case as shown in the following table:

Houses	Cases	Total Cases	Houses	Cases	Total Cases
38	2	76	1	5	5
18	3	54	1	6	6
9	4	36	1	7	7
—		—	—		—
			68		184
			34.4%		58.4%

In nineteen instances there were cases of bacillary dysentery in the same house in 1916. Thirty-two of the patients gave a history of previous attacks of dysentery.

Maps were made showing the location of privies, unprotected garbage and one on which were spotted the cases of dysentery (see following page), very definite conclusions could be drawn as to the relationship between the cases and the fly. This view was confirmed by the fact that the case incidence dropped very quickly when the hot weather moderated and the flies became less active. None of the privies found were sanitary; screens were conspicuous by their nonexistence.

That personal contact was a large factor in the spread of the disease can be seen from the table above showing that 34.4 per cent of the houses contained 58.4 per cent of the cases. In addition we found that many of the cases could be grouped according to place of occupation. Four cases were employed in factory "A"; 4 were employed in factory "B" and in addition the father of another case; 5 cases were employed in factory "C" and in addition the fathers of 3 others; 2 cases worked in factory "D," 5 in "E," 2 in "F," 5 in "G" and 2 in "H."

The food supply was investigated in all cases, but in no case could any number of patients be found who had bought food in any one particular establishment. A strange feature of this part of the investigation was that in one instance a case of chronic bacillary dysentery was found in a woman who owned a small grocery store, but no cases developed among those who had bought food in this store. In another instance two cases occurred simultaneously in a family living some distance from the epidemic center. Upon investigation it was found that the family had eaten bread purchased in a dirty bakery located only a short distance from several privies adjoining houses in which there were cases of bacillary dysentery. This bakery was infested with flies and all foodstuffs were uncovered; therefore it was very probable that flies had contaminated the bread.

The milk used by the various cases of dysentery was found to have been supplied fairly equally by all of the fourteen dealers of the city.

That the water supply was not responsible was quite evident from the fact that all of the early cases were in one section of the city. In addition, a study of the bacteriological reports of the daily water examinations absolutely excluded the water as a source of infection.

Control of the epidemic was a difficult problem. From the very beginning it was recognized that there were large numbers of missed cases, and prompt search for such cases was begun. The local health board passed a regulation calling for the prompt reporting of all cases of diarrhea. A house to house

canvass was made in the western part of the city and in this way 168 cases of bacillary dysentery were discovered. Strict isolation and quarantine were deemed impracticable since it would then have been impossible to search out the mild cases. It was thought to be of greater value to find these cases and to instruct them in precautionary measures.

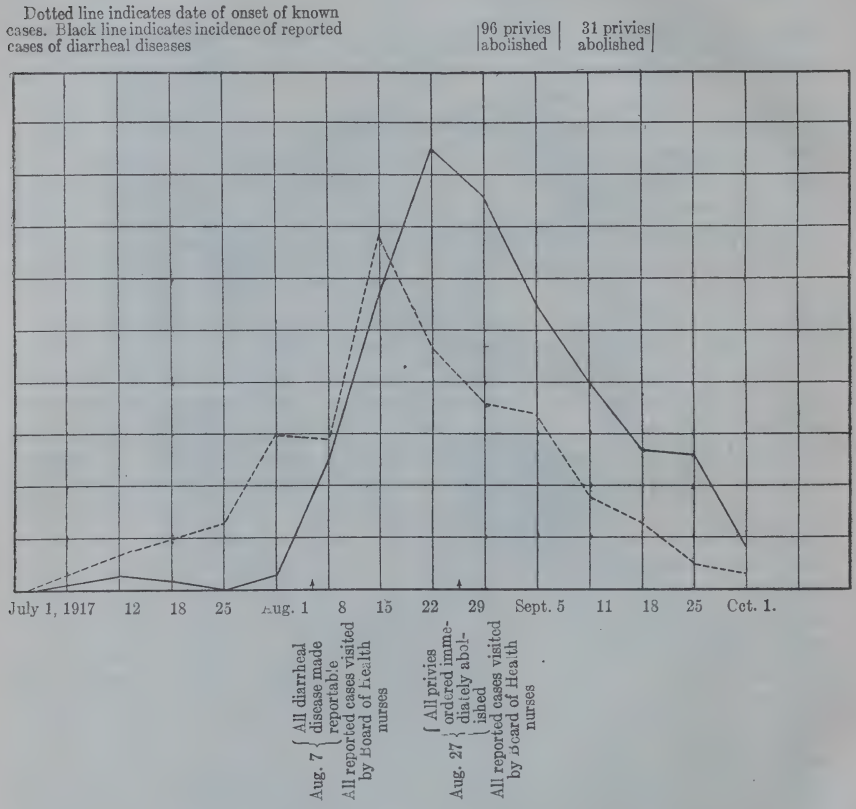
Map of City Showing Location of Cases

Three local nurses were used exclusively for intensive follow-up work. As soon as a case of diarrhea was discovered it was investigated to determine whether it was bacillary dysentery or simple diarrhea. Instructions as to screening, cleanliness, disinfection of discharges, etc., were given. If the case were bacillary dysentery the patient was visited by one of the nurses whose duty it was to see that the instructions given were properly executed. In nearly all cases observation was continued until at least two examinations of stools, at least twenty-four hours apart, were negative.

Hospitalization was carried out in so far as possible, but owing to the large number of cases and lack of hospital facilities this could only be accomplished with an insignificant number.

Preventive inoculations with a toxin-antitoxin mixture and with polyvalent dysentery vaccine were given to contacts, wherever their consent could be secured. As comprehensive a list of contacts as possible was obtained in all cases. The total number of contacts listed was 995; of these 834 received no immunizing treatment and subsequently 109 or 11.9 per cent developed dysentery. Of the remainder 161 received immunization

POUGHKEEPSIE BACILLARY DYSENTERY, 1917


Dotted line indicates date of onset of known cases. Black line indicates incidence of reported cases of diarrheal diseases
96 privies abolished
31 privies abolished
July 1, 1917
12
18
25
Aug. 1
8
15
22
29
Sept. 5
11
18
25
Oct. 1.
Aug. 7 All diarrheal disease made reportable. All reported cases visited by Board of Health nurses
Aug. 27 All privies ordered immediately abolished. All reported cases visited by Board of Health nurses

and only 4 or 2.5 per cent subsequently developed the disease (53 received toxin-antitoxin mixture, and 4 or 7.5 per cent developed dysentery; 108 received polyvalent dysentery vaccine and none subsequently became infected).

Treatment of the actual cases varied. For the treatment of the more severe cases, a few of the local physicians used the polyvalent antidysentery serum made in the laboratory of the State Department of Health. The results were excellent. The dose recommended at first was 20 c. c., but experience showed that this was inadequate as the best results were obtained by the us of at least 50 c. c. or more. This was repeated every twenty-four hours if necessary (usually two or three such doses were sufficient). In one case

the serum was used intravenously with almost miraculous result. Frequently following the use of the serum blood promptly disappeared from the stools and the frequency of bowel movements was reduced from 50 or 60 per day to 20 or less. In one instance there was a reduction in frequency from 60 to 4 movements per day within the 24 hours following the use of the serum.

The fatality rate, 4.1 per 100 cases, is low, especially when compared with the fatality rate in the epidemic of 1916, 21.6. This was due in part to the fact that the Shiga type of organism, which is the most toxic type, occurred less frequently, and also may be due in part to the more common use of antidysentery serum in large dosage.

The principal condition which prevented prompt control of the epidemic was the fact that from ten days to two weeks elapsed after the onset of the disease in an individual, before that case came to the attention of the health authorities. The chart (page 134) shows this elapsed time.

Conclusions

1 Bacillary dysentery presents itself as a variable symptom complex. All cases of intestinal disturbance associated with diarrhea should be treated as cases of bacillary dysentery in so far as measures to protect the health of the community are concerned.

2 Reporting all cases of diarrhea to the health department, is a measure to be recommended.

3 Polyvalent dysentery vaccine should be used in all cases of contact with an established case of bacillary dysentery.

4 Polyvalent antidysentery serum should be used in large doses, at least 50 c. c. in the treatment of severe cases of bacillary dysentery.

5 Sanitary conditions must prevail in order to prevent bacillary dysentery from assuming epidemic proportions once it is introduced into a community.

During and following the Poughkeepsie outbreak numerous cases were discovered in nearby municipalities and vigorous action was taken by state and local health officials to prevent further spread of the disease.

Two smaller outbreaks, worthy of special comment, occurred during the late summer and early fall.

During September, Dr. C. R. Hervey, Sanitary Supervisor, investigated an outbreak of 12 cases which occurred in the towns of Walworth, Williamson and Ontario, Wayne county. The striking features regarding this outbreak were that at the time of investigation two members of the first family to be infected had died and a third was regarded as moribund, and that subsequent cases were traceable to contact with members of this first family. Apparently none of the cases were confirmed bacteriologically.

The fact of a negative report having been received upon a fecal specimen from one case is possibly accounted for by delay in transmission through the mail to the laboratory at Albany. Dr. Hervey described the clinical picture in one typical case as follows: sudden onset; elevation of temperature for about five days to approximately 102,° with marked weakness following subsidence of fever, abdominal tenderness; ten to twenty bowel movements, with blood and mucus, daily, increasing in number to twenty or thirty, the movements later becoming putrid in odor and resembling "meat water".

During August and September there occurred in the village of Deposit and vicinity an outbreak in which 57 cases were discovered and with 7 deaths. Forty-eight cases were reported from the village, 3 from the town of Deposit and 6 from the town of Sanford. The outbreak was investigated by Dr. Laidlaw and Dr. Conway, Sanitary Supervisors of the two districts involved, assisted by Dr. Godfrey, Epidemiologist.

Cases occurred in various age and sex groups as follows:

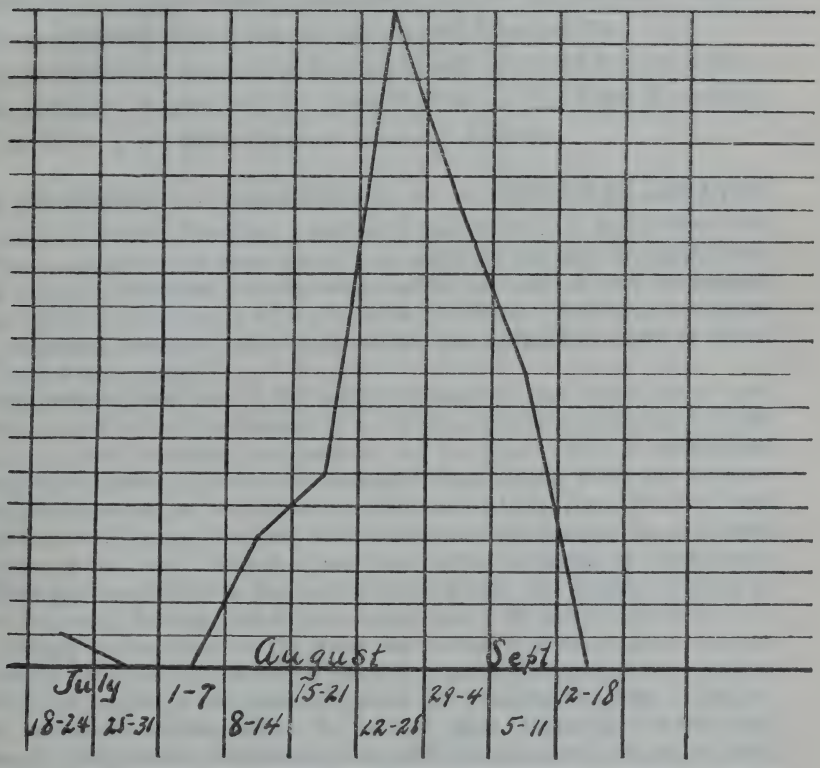
AGE	Males	Females	Total
Under 1	.....	.....	.....
1– 4	3	2	5
5– 9	3	5	8
10–14	4	2	6
15–29	5	7	12
30–49	2	8	10
50 or over	4	4	8
Unstated	2	6	8
Total	23	34	57

The chart No. 3 shows the incidence of cases by weeks, according to dates of onset. It will be noted that the greater number of onsets fell within the week from August 22 to 28.

From the fact that the cases were distributed over a wide area, including the county outside of the village, and had nothing in common except that practically all had used the village water to some extent, the water supply was regarded with suspicion.

Neither inspection nor analysis (bacterial count being low and no colon bacilli being present in 1 c.c. samples) confirmed this suspicion. If water is excluded as a source of infection, it must be assumed that contact, and to a less extent, flies, were responsible for the spread of the disease.

Chart 3



Dysentery at Deposit, 1917, Incidence by Weeks

Diphtheria

During the year 19,183 cases of diphtheria were reported in the state, 12,624 of these from New York City and 6,559 from the rest of the state. In the state, as a whole, 1,745 deaths occurred. (For detailed analysis of diphtheria statistics for the year, see special report, page 141.) Except for Albany County, which had a case rate of 737 per 100,000 population, the highest case rate was maintained in Broome County with 550. This excessive rate was chiefly accounted for by an outbreak which occurred during the winter in the city of Binghamton.

A summarized account of this outbreak prepared by the writer, then sanitary supervisor, for presentation at the annual meeting of the New York State Medical Society, follows:

AN OUTBREAK OF DIPHTHERIA IN A SECOND CLASS CITY

Late in November, 1916, the attention of the officials of a second class city, having a population of about 54,000, was called to the fact that diphtheria had become so prevalent that the municipality was charged with the highest case rate for this disease of any city in the State. Following a request for assistance from local officials, the writer was assigned to assist in efforts to control the disease.

The outbreak was not of the rapidly developing type which, as a rule, yields readily to the application of scientific preventive measures, but one which had been developing progressively for four years and had become generally disseminated. The records indicated that, during 1912, but 28 cases had been reported; in 1913 there were 60; in 1914, 143; in 1915, 201; and finally, in 1916, there were 358, with the greatest incidence in the last three months of the year. Nearly a year before, the attention of local health officials had been called to the fact that the disease was largely localized in one city ward. During 1916 it had invaded nearly all parts of the city.

Through the medium of the press the public had been advised of the intended action of the Board of Health, namely, to publish the name of every barn owner in the grade to which his score entitles him. Class A, (75 or over) excellent, Class B, (65–75) good, Class C, (50–65) fair, Class D, unhygienic. Cleanliness alone will place an owner in A, B, or C and any one maintaining a stable which falls below these classes is devoid of consideration, for the welfare of himself or his neighbors, is a menace to the community and should be summarily dealt with.

In the clean-up campaigns, a system of scoring also tends to stimulate interest and affords to the property owner a definite idea of what is required in the movement for municipal cleanliness and beautification.

From a preliminary survey, we made the following deductions: Generally speaking, 79.5 per cent of the cases had occurred among persons under 20 years of age, the greater number localized to some extent in districts covered by a few public schools. A detailed study of cases in one or two such districts showed that a majority of the cases were among school children, while

in a number of other families with cases under or over school age, there were school children, many of whom had had sore throats.

There had been continuously occurring cases of "sore throat" and "tonsilitis," so-called, to some of which no physician had been called.

Laboratory work for the city was done under contract by a local firm. Swabs were supplied to the physicians, and, from these, culture tubes were inoculated at the laboratory. Most of the culture material submitted had come from a very few of the 70 or more general practitioners in the city.

Release from quarantine, as elsewhere, depended upon the securing of two successive negative cultures. Swabs were made by the attending physicians, and reports, both positive and negative, returned as a rule after twelve hours' incubation. There were practically no records of culture examinations, but, so far as could be learned, rarely if ever had a case been kept in quarantine more than two weeks from the date upon which the first release culture had been taken. There was no culturing of contacts.

Broad interpretation of the quarantine regulations of the Sanitary Code, due in some part to difficulty of securing adequate financial relief for quarantined persons, together with lack of method and facility for following up quarantine, rendered it more or less ineffective. Terminal fumigation was relied upon for disinfection. There were hospital facilities for twelve cases of all communicable diseases, other than smallpox.

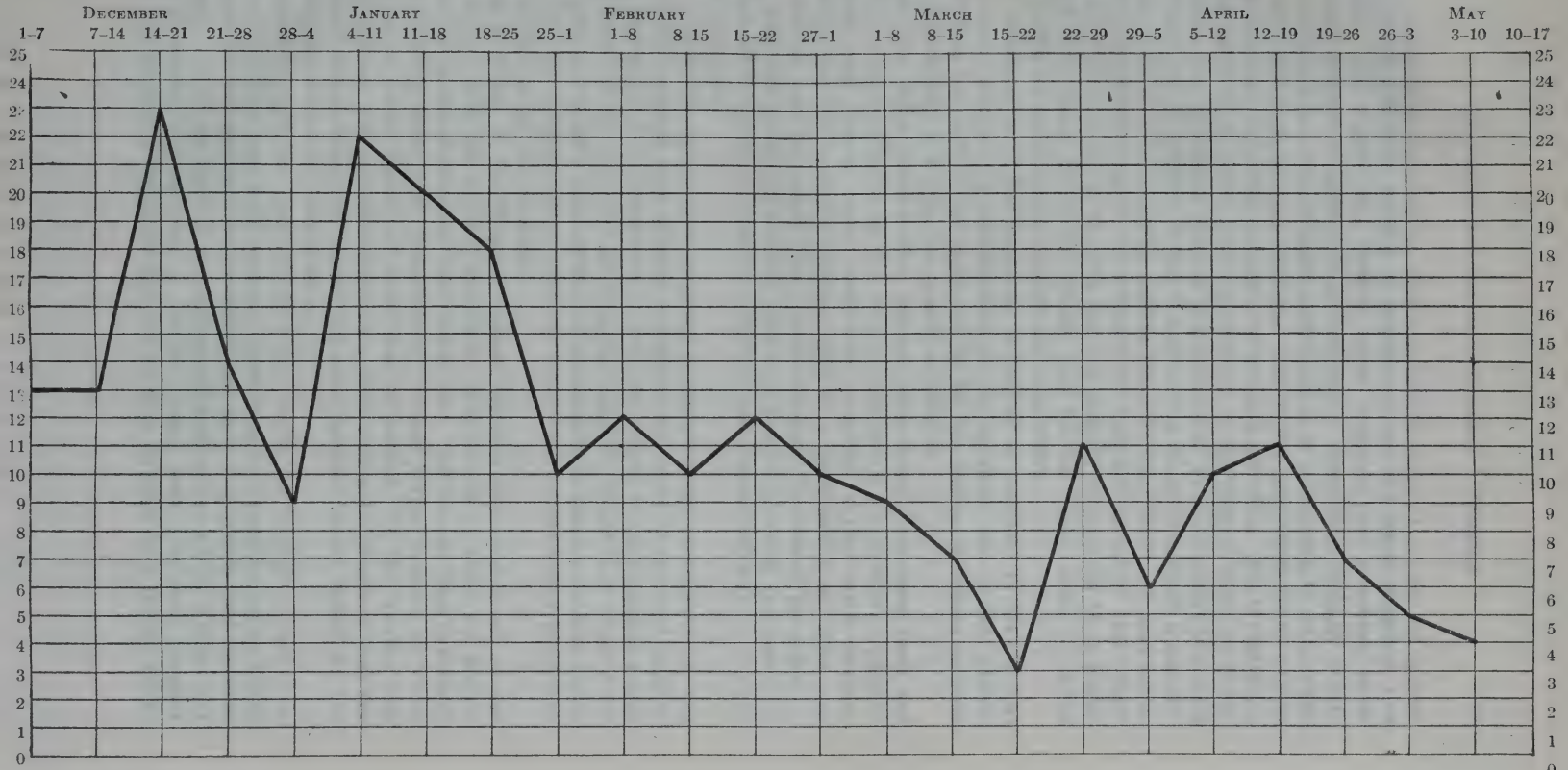
There were approximately 7,000 children attending the public schools, with some 1,200 additional in three parochial schools. In the public schools a well organized department of physical welfare, with a small staff of physicians and nurses, was working practically independently, except that cases of communicable disease were reported and a representative visited the Health Department daily, examining the files of report cards received from physicians.

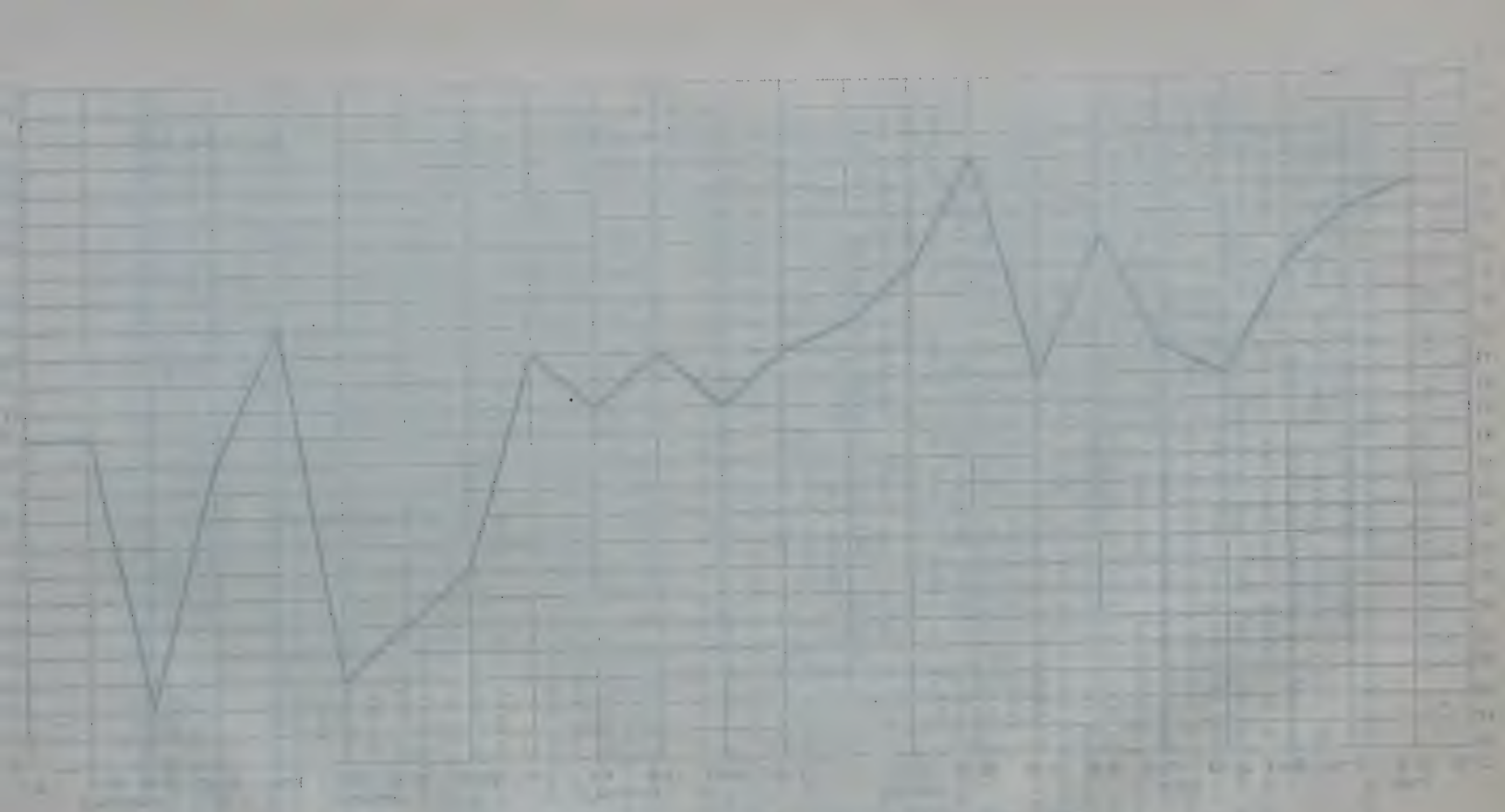
Following the survey, our first procedure was to arrange a meeting of local physicians with city and school officials. The situation was presented, regulations reviewed, culture material and report cards distributed, and the plan of campaign outlined. Immediately following this meeting there was a marked increase in the number of cases reported and cultures submitted to the laboratory.

The plan of campaign included the culturing of school children and contacts, control of carriers, close supervision and enforcement of rational quarantine, hospitalization where necessary, the seeking out of unreported cases, and the opening up of various channels of communication between the schools and the Health Department. Our plans were carried out as fully and effectively as local conditions and a limited corps of workers permitted. It soon became necessary for the city to provide additional hospital facilities, the result being permanent provision for at least 30 patients. The local laboratory facilities were found inadequate to meet the increased demand and it was necessary at times to send from one to two hundred cultures daily to the State laboratory at Albany.

A rule was promulgated providing that cultures for release from quarantine should be taken by the attending physician in any case if he so desired, until one negative culture had been obtained, after which subsequent cultures would be taken by a representative of the Health Department. This

Weekly Case Incidence, Diphtheria in Binghamton, New York





was a formidable undertaking, with our limited corps of nurses, but seemed essential to successful control of quarantine, and the result confirmed this opinion. The reasons are obvious: after a patient has recovered, he is naturally anxious to be freed from restrictions. Pressure is brought to bear upon the physician who, without compensation, is called upon to make visits for the purpose of securing cultures. One or two gratuitous visits may be made cheerfully, if he is in sympathy with health activities. But if diphtheria bacilli continue to make their appearance, in the present state of public education the physician becomes unpopular and he is scarcely human if he is not strongly tempted to follow a procedure which will insure a negative culture report. The following figures taken recently from our quarantine records, are interesting in this connection: during a period of about three months, prior to April 1, 30 cases had had positive cultures for three weeks, 23 for four weeks, 13 for five weeks, four for six weeks, seven for seven weeks, two for eight weeks, and one for nine weeks.

In consideration of the foregoing, the writer is confirmed in his personal belief that, both out of consideration of the physician and in the interest of effective quarantine, the responsibility for the taking of release cultures should invariably rest upon the health authorities.

The dates upon which release cultures were taken, both upon cases and carriers, were recorded from day to day upon charts arranged with parallel columns, and reports upon them were recorded as they were received. Reports were also recorded alphabetically in a loose leaf book. This constituted the most important duty of a special clerk. In view of the difficulty, even with this system, of avoiding errors, it was evident that the control of releases with reports received by telephone and unrecorded, was, to say the least, uncertain.

To control the exclusion from school of children with sore throats, it was ultimately arranged that children apparently ill would be excluded immediately and reported for investigation, while the others would remain in school to be examined by one of the school physicians, who visited each school daily. This system avoided a large number of unnecessary exclusions and was highly effective, but consumed practically the entire time of the school physicians and nurses during several weeks.

The culturing of the throats of school children was carried out by the school staff, with the writer's assistance. The schools in which the largest number of cases had occurred were visited first. All throats were examined, cultures being made from those showing redness beyond normal, or where there was a known history of sore throat or contact. In this locality congested throats and catarrhal conditions were unusually prevalent, and the increased susceptibility to throat disorders without doubt added to the difficulty of controlling the disease.

After visits had been made to all of the schools, we devoted our attention to those in which cases still occurred. According to circumstances we either re-examined and cultured entire schools, or went into grades and cultured contacts. Up to the time of writing, approximately 249 school carriers had been discovered and isolated, a number having been previously released cases. It frequently happened that two or more children in a family, all in

different grades, were found to be carriers. In one such family there were three carriers, all of whom were still positive and virulent at the end of twelve weeks. In this connection, in every instance in which virulence tests were made upon school carriers, the organisms were found to be virulent. In the schools in which there had been the largest number of cases, there was an immediate and marked decline following the exclusion of the carriers.

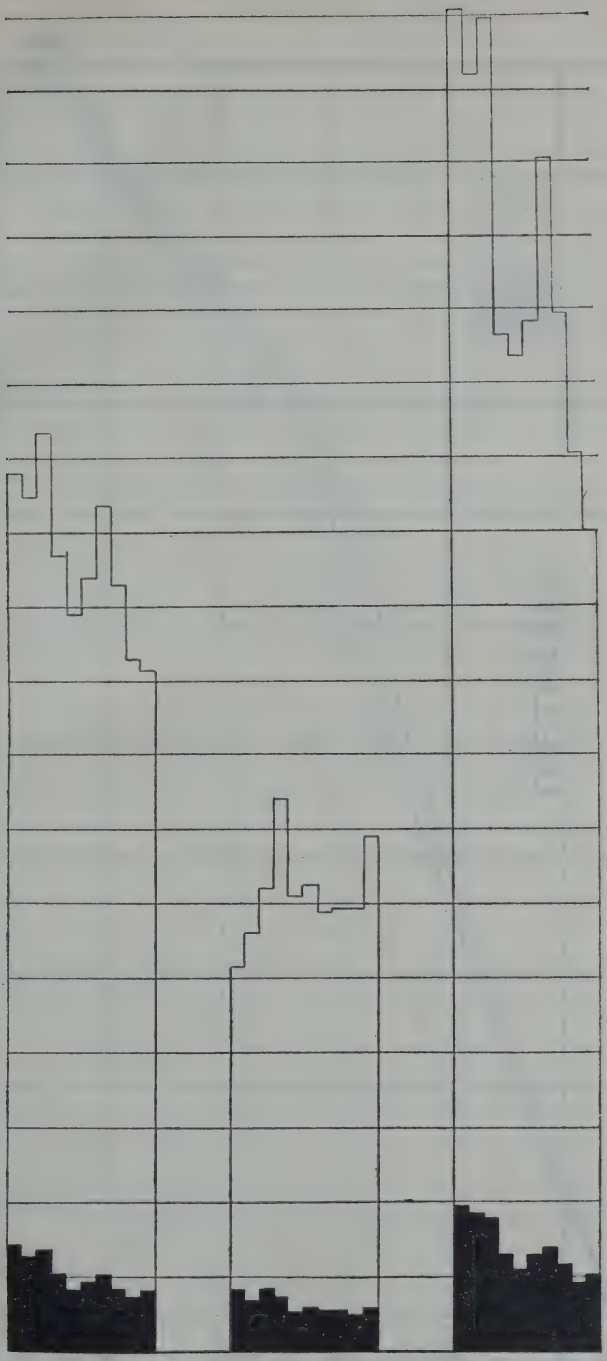
The exclusion from school and isolation of a large number of children, unfortunately at a time when examinations were pending, created a difficult situation, not less difficult from the fact that germ carriers were an innovation. Parents of persistent carriers were urged to consult their family physicians and a limited number acted on this advice. In some instances this resulted in active local treatment being instituted. In others, physicians were quoted as advising parents that treatment and isolation were unnecessary, and when a simple gargle proved ineffective, nothing further was done. Later one of the city physicians volunteered to give local treatments to a number of such carriers. On April 23 there still remained a group in which, in spite of such treatment, the carrier condition had persisted for from two to three months, and where removal of tonsils had been refused.

The following illustrates concretely the possibilities of spread of infection through carriers, in this instance an adult: Four or five cases had occurred during a period of two or three months in one of the railroad offices. In December a child of a clerk in this office developed diphtheria. Several weeks after the discharge of this case, a second child in the same family developed the disease. At this time a culture was secured from the father, and it was learned that about four months before he had had a sore throat. The doctor had suspected diphtheria, had sent a swab to the local laboratory, received a negative report, and changed his diagnosis. Pending a report on the culture, the father, in order to continue at work, moved to the home of an adult brother, who developed diphtheria a few days later. The culture proved this man still to be carrying diphtheria organisms, which promptly disappeared following tonsillectomy.

Another instance emphasizes the importance of culturing, by physicians, of suspicious throats, and by health departments, of contacts. A physician without making a culture diagnosed a case as tonsilitis. He telephoned the Health Department, however, suggesting that a nurse call. Cultures taken by the nurse demonstrated that six members of the family were diphtheria carriers.

The case incidence from early December, at which time our campaign was begun, has been interesting. Twenty-three cases were reported in a week immediately following our meeting of physicians. During the holiday vacation the cases dropped to ten in a week and rose again to 22 shortly after the reopening of the schools. From that time on, during a period of eleven weeks in which our activities were continued without remission, in spite of unfavorable weather conditions there was a gradual decline, until in the week ending March 22, but three cases were reported. At this time it was felt that the Sanitary Supervisor was more seriously needed in other parts of his district; the school physicians and nurses began to take up their routine work and one of the State's supervising nurses and a clerk

Chart 4



Entire State | Rest of State | New York City

ANNUAL CASE AND DEATH RATES PER 100,000 POPULATION FOR DIPHTHERIA, 1908–1917 FOR ENTIRE STATE, NEW YORK CITY AND REST OF STATE.

different grades, were found to be carriers. In one such family there were three carriers, all of whom were still positive and virulent at the end of twelve weeks. In this connection, in every instance in which virulence tests were made upon school children, the organisms were found to be virulent. In the schools in which there had been the largest number of cases, there was no quarantine and carried on while following the exposed the carriers.

The exclusion from school and isolation of a large number of children, unfortunately at a time when examinations were pending, ended a difficult situation, and less difficult from the fact that germ carriers are an innovation. Parents of persistent carriers were urged to consult their family physicians and a limited number acted on this advice. In some instances this resulted in active local treatment being instituted. In others, physicians were quoted as advising parents that treatment and isolation were unnecessary, and when a single gargle proved ineffective, nothing further was done. Later one of the city physicians volunteered to give local treatments to a number of such carriers. On April 25 there still remained a group in which, in spite of such treatment, the carrier condition had persisted for from two to three months and where removal of tonsils had been refused.

The following illustrates repeatedly the possibilities of spread of infection through carriers, in this instance an adult. Four or five cases had occurred during a period of two or three months in one of the school offices. In December a child of a clerk in this office developed diphtheria. Several weeks after the discharge of this case, a second child in the same family developed the disease. At this time a culture was secured from the father, and it was learned that about four months before he had had a sore throat. The doctor had suspected diphtheria and sent a swab to the local laboratory, received a negative report and changed his diagnosis. Failing a report on the culture, the doctor, in order to continue at work, went to the home of an adult brother, who developed diphtheria a few days later. The culture proved this man still to be carrying diphtheria organisms which promptly disappeared following bacilliferin.

Another instance emphasizes the importance of culturing by physicians, of suspicious throats, and by health departments, of contacts. A physician without making a culture diagnosed a case as tonsilitis. He telephoned the health department, however, suggesting that a nurse call. Cultures taken by the nurse demonstrated that six members of the family were diphtheria carriers.

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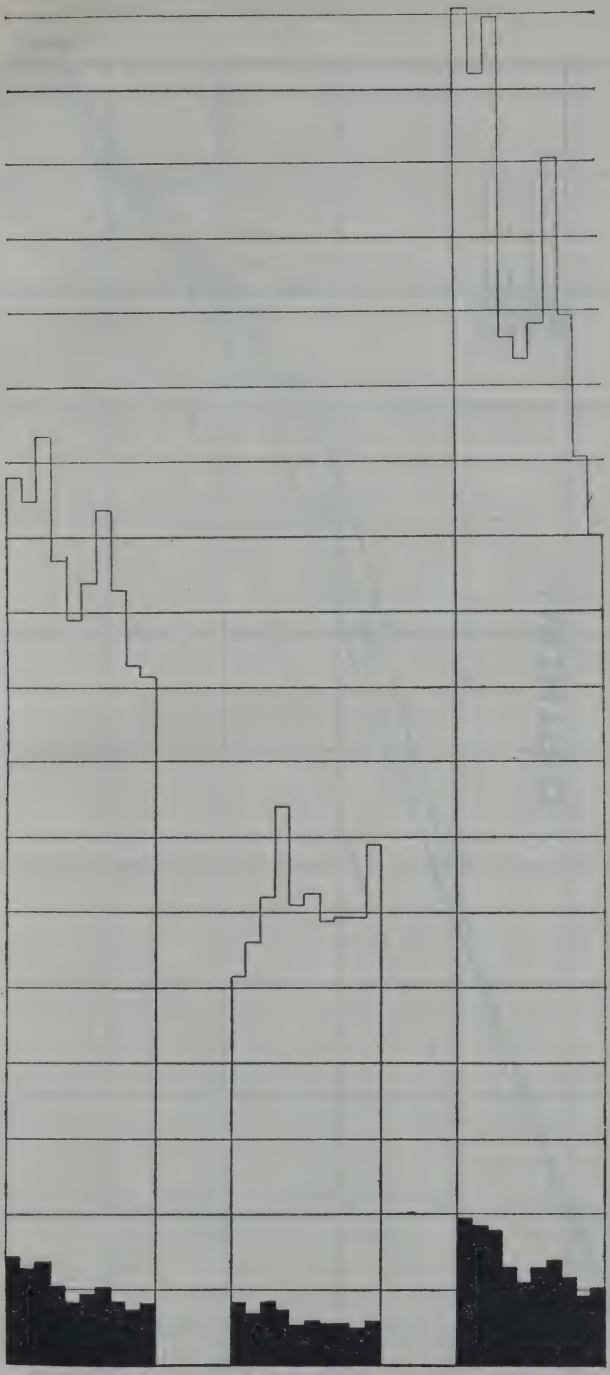
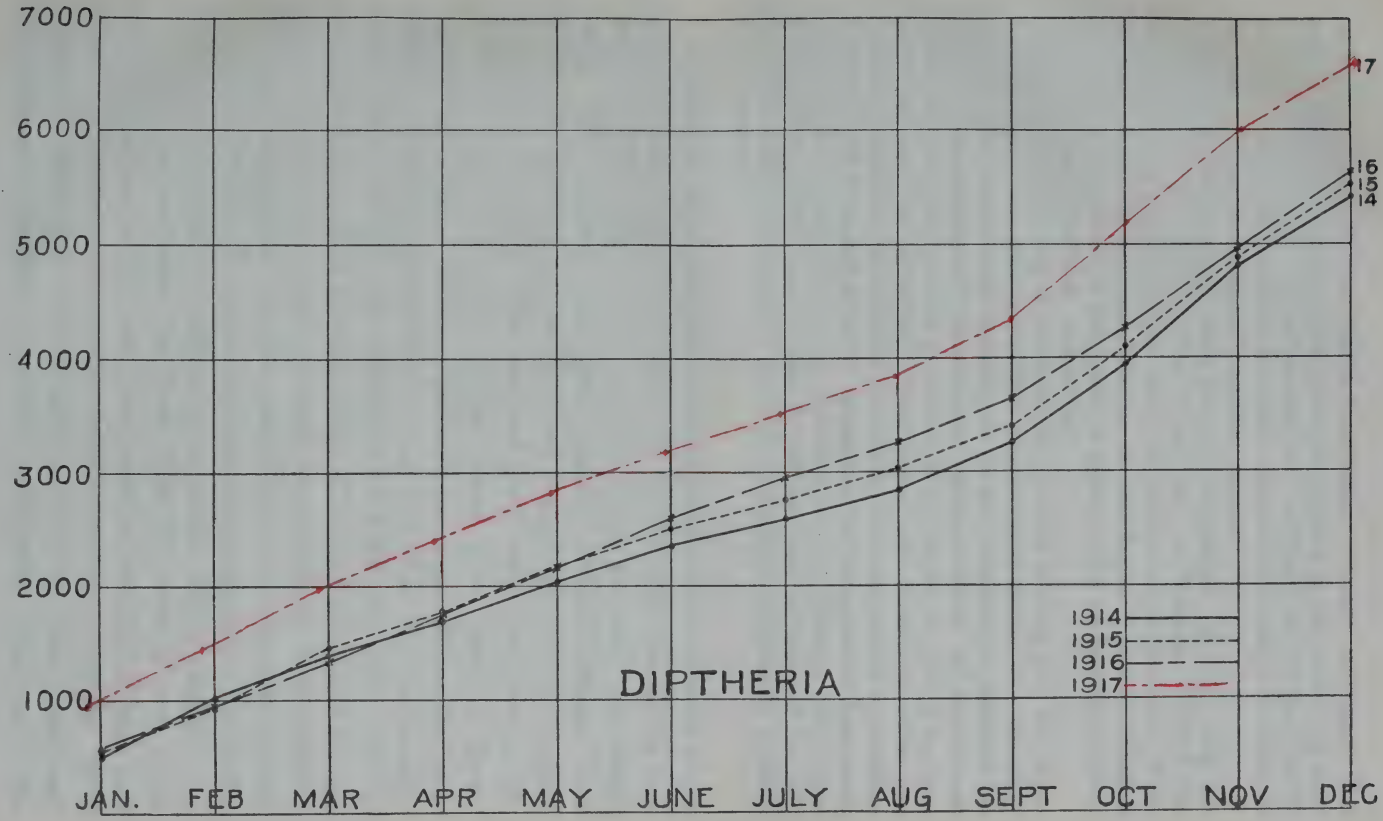
Chart 4



ANNUAL CASE AND DEATH RATES PER 100,000 POPULATION FOR DIPHTHERIA, 1908–1917 FOR ENTIRE STATE, NEW YORK CITY AND REST OF STATE.

Chart 5



Cumulative Monthly Cases of Diphtheria in New York State, Exclusive of New York City, 1914–1917 Inclusive.

remained to assist the local Health Department. Probably as a result of a general relaxation, there has since been an increase in the number of cases to about nine weekly. It is believed that reorganization of local health activities, coming at a time of favorable climatic conditions, will result in the case incidence again being brought to normal.

Figures indicating crude death rates are significant. In 1915, with 201 cases reported, the death rate was 12 per cent. In December, 1916, it was 6.3 per cent; in January 1.3 per cent; and in February 1 per cent. While the diminishing rate may have been due in some degree to earlier treatment with antitoxin, it seems to the writer to reflect chiefly the increased reporting of mild cases, previously unreported.

In conclusion, a study of this outbreak presents nothing new, but serves to emphasize certain well established general observations: (1) Generally speaking, the communicable disease rate in any municipality indicates the degree of organization and effectiveness of health activities. (2) An outbreak is difficult to control in direct proportion to the length of time it has been under way and the extent of dissemination. (3) Health activities are thoroughly organized only when there is complete coordination of activities of all agencies interested in health protection, including health department, schools, medical profession and lay organizations. (4) There is serious need of stimulation of civic consciousness and of education, not alone of the laity but of the medical profession, to the need of intelligent cooperation, if health is to be protected.

Diphtheria which in 1916 for the first time in the history of the state reached a death rate below 15 per 100,000 rose above that mark in 1917. The rate is, however, lower than any year except 1916. The increase was about equally divided between New York City and the rest of the state though the relative increase was greater up-state. The case and death rates are shown in the table on page 202 and a graph drawn from them is shown opposite this page. While diphtheria no longer claims the large number of victims it did thirty years ago when the rate usually varied from 80–100 per 100,000, and while the rate today is approximately half of the usual rate of ten years ago, yet for the past seven years the rate has shown comparatively little decline. It seems remarkable that the case fatality rate remains as high as it does despite the quite complete knowledge we have of the cause of diphtheria, its mode of transmission and treatment.

As in previous years, the New York City rate is very much higher than the up-state rate, due almost entirely to a higher case rate — the difference in the case fatality rates is very slight. It is found that the highest case fatality rate is in the group composed of Buffalo and Rochester (175,000 — 500,000). The rate in the

former city was 10 per cent, in the latter 12.5 per cent, the combined rate 10.8. In Rochester the disease was said to have been of unusual virulence in the later months of the year and there were an unusual number of deaths among adults.

Among the second class cities the disease prevailed extensively in Binghamton and the nearby villages. An outbreak beginning late in 1916 extended over into the early part of 1917 and reappeared in decreased intensity in the fall. The outbreak in 1916 appears really to have been simply the culmination of a condition that had existed for three years previously. The adoption of systematized control brought to light a large number of carriers and resulted in an apparent temporary increase in the number of cases. A decline rapidly set in as is usual in such circumstances, though it required three months of intensive work to bring the outbreak to a successful conclusion. In November the case incidence again rose to abnormal proportions but was promptly brought under control by the reorganized local health department.

In December the attention of the department was called to the unusual prevalence of the disease in Gloversville. Investigation was begun only two weeks before the close of the year but brought to light the fact that the cases had been unusually numerous for the preceding three months and, although every section of the city had had a case, the disease was unusually prevalent in the sections served by two of the public schools. The age incidence showed a large preponderance of school children among those attacked and with but very few exceptions children attending one or other of these two schools were members of families attacked. In a number of instances neighborhood contact was quite as possible as school contact. A study of the individual cases showed that in one school nearly all the cases had been confined to one grade, culturing of which yielded four carriers one of whom proved later to be carrying nonvirulent oragnisms. One of the others was a child who had had clinical diphtheria in September — three months previously — but had been released on two negative cultures.

As cases had occurred quite generally throughout the second school it was decided to culture all those attending it. The chief

difficulty lay in the fact that the school had been closed as a means of preventing further spread of the disease. Seventeen carriers were found among those who attended in response to the announcement that attendance was desired for that purpose and among these were several who had had clinical diphtheria or were members of families in which clinical cases had existed. These findings led to the reculturing of all cases that had previously been released and to the adoption by the local board of health of a rule requiring that negative cultures should be obtained from all members of quarantined families prior to release and that release cultures should be taken by a representative of the board. Wage earners were isolated until one negative culture was obtained followed by a second culture taken after removal from the quarantined premises.

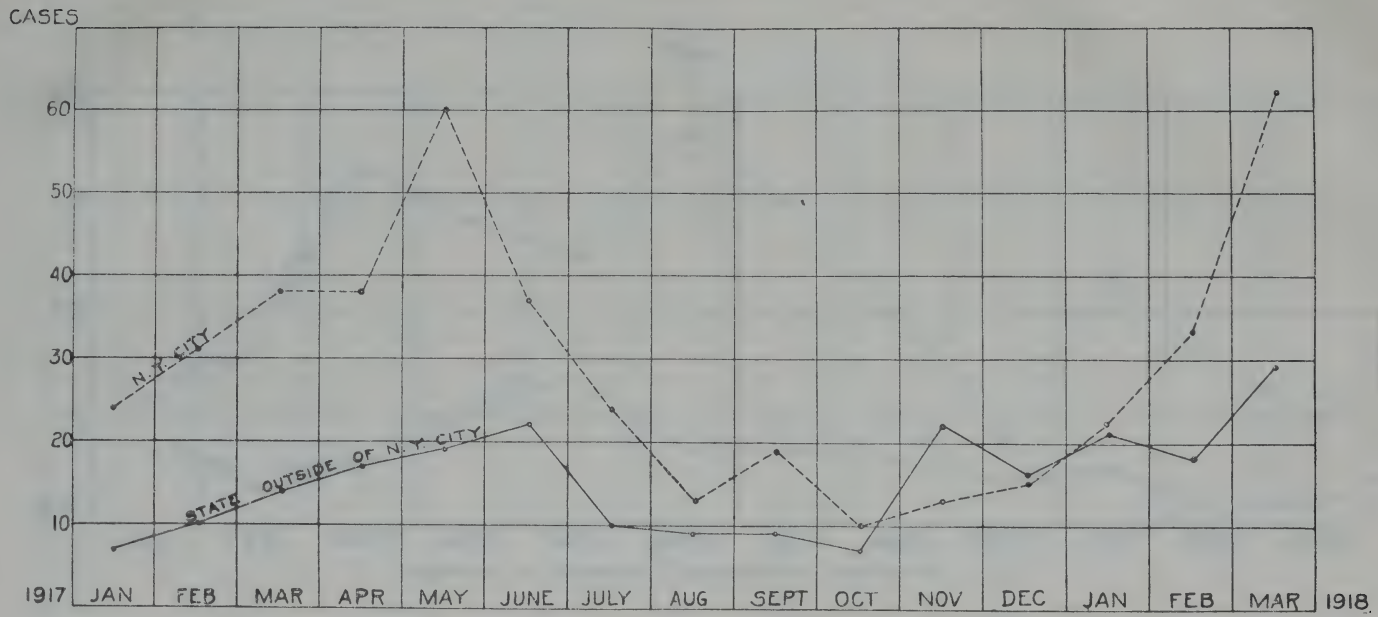
The outbreak continued into 1918 but with the important difference that the cases no longer prevailed chiefly among school children — in fact but 3 or 4 cases occurred among them in January and February. Incidentally, one of the discovered school carriers explained satisfactorily a number of cases not explicable by school contact. This boy aided one of the milk dealers in the distribution of his supply, ran many errands, sold papers and was generally industrious and ubiquitous. The school cultures also brought to light one or two carriers who had had clinical diphtheria but had shown negative cultures at the time of their illness. These cases, with some exceptions, had not been isolated and constituted additional sources of infection. It was learned that a considerable number of such cases had existed in October and November and were regarded, because of the severity of the symptoms and the absence of diphtheria organisms, as cases of septic sore throat or severe tonsilitis.

A partial explanation of these negative cultures was found in the difficulty of maintaining an even and proper temperature in the incubator at the laboratory owing to the thermostat having been out of order for an unknown period of time. There were also some well marked clinical cases giving negative throat but positive nasal cultures, the throat cultures showing staphylococci. Cultures of Hoffmanii were very numerous among contacts and school children cultured, from 20 to 30 per cent showing them among the children attending the second school cultured.

The similarity of the Binghamton and Gloversville outbreaks to other outbreaks investigated elsewhere, leads to the belief that the appearance of any unusual number of cases in a community should promptly lead to the adoption of more stringent methods of control than are provided in the rules of this department. The most important measures are the culturing of all members of a household prior to raising quarantine and the culturing of suspicious prior contacts for the purpose of discovering the carrier or missed case responsible for transmitting the infection. Culturing intimate subsequent contacts outside the household will sometimes lead to the discovery of an incipent case or carrier though this procedure is not always worth the difficulties encountered in obtaining the cultures. A rule requiring that release cultures shall be taken by a representative of the local Board of Health is usually advisable and sometimes necessary. It saves the attending physician many unrequited visits, saves him from the responsibility of maintaining the quarantine and in some instances prevents the submission of improperly taken cultures.

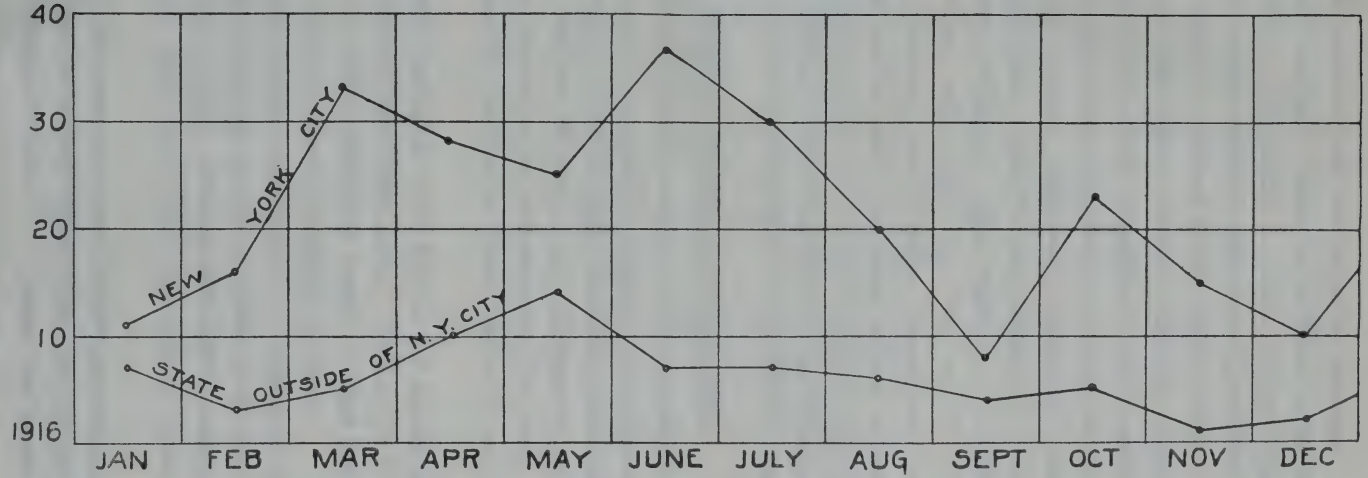
The groups of smaller cities of the State show case fatality rates ranging from 6.3 to 7.3 per cent, indicative of more prompt diagnosis and treatment and possibly of lower virulence and more complete case reporting than in the larger cities. The so-called rural section of the State, which however, includes all the villages with three exceptions, had a case fatality rate of 9.5 per cent. A further analysis of the figures for this group is suggested by this to determine to what extent it is due to delayed diagnosis and treatment. The difficulty of winter travel in the "truly rural" districts may be the determining factor in raising the rate for the group. The death rate is the lowest in the state. In fact the death rate throughout the groups grows progressively smaller as the units decrease in population — the first class cities having the highest, the "rural" districts the lowest. While perhaps little can be done by health departments to better many of the conditions incident to urban life yet varying rates of the cities within a given class show that much can be done to lessen the incidence of infection. Congested street cars and crowded movies do not cause diphtheria but simply provide excellent points for the

Chart 6

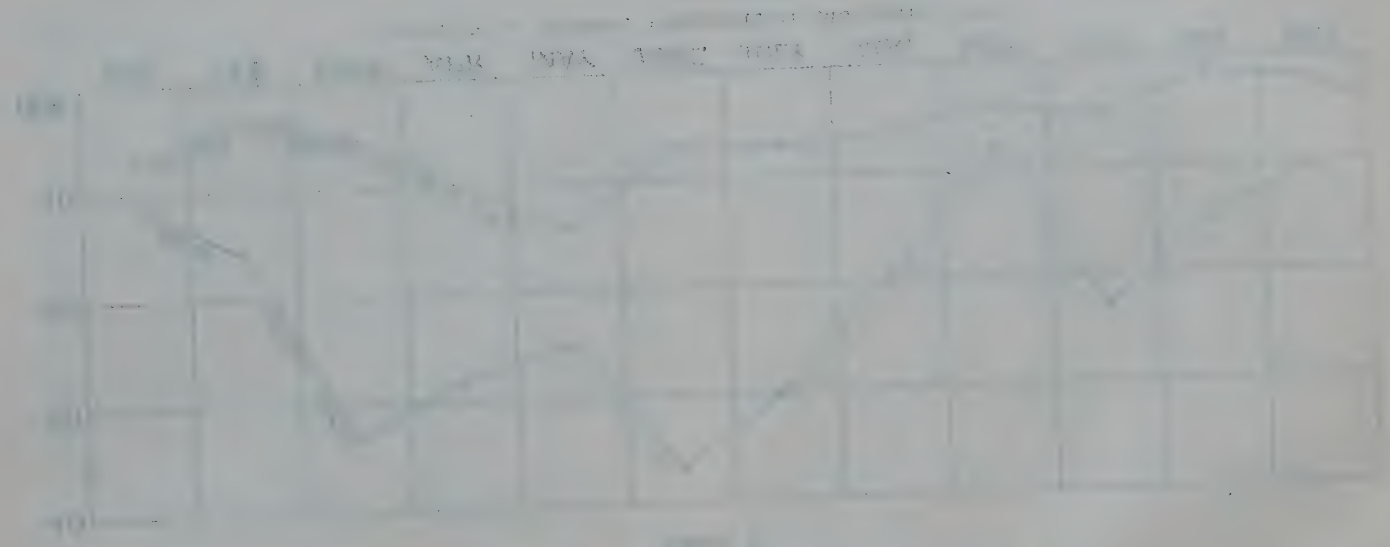


Incidence of Epidemic Cerebrospinal Meningitis, 1917

Chart 7



Incidence of Epidemic Cerebrospinal Meningitis, 1916



exchange of the secretions of the upper air passages. That some of these secretions contain virulent diphtheria organisms is partly a matter of chance and partly a matter of inadequate control. No sane person would contend that every inhabitant of a community should have a culture taken before being permitted to roam at large — the labor involved and the resulting inconvenience would be out of all proportion to the results achieved; but the number of virulent diphtheria carriers can be materially reduced and the disease effectively controlled when all sore throats and suspicious contacts are cultured. This means a medical profession willing to take cultures, a public willing to have them taken and abide by the result without prejudice to the physician, and a health department competent to institute proper control and determine within reason what constitutes a "supicious contact." All of these imply a willingness to make an immediate personal sacrifice for an ultimate communal gain and signs are not wanting that it is gradually coming about.

Epidemic cerebrospinal meningitis

In view of the well known tendency of this disease to prevail in military camps, and the possible danger of the dissemination of the disease through carriers brought in as the result of the mobilization of large numbers of troops, the incidence of epidemic meningitis has been observed closely throughout the year. Chart No. 6 shows incidence by months for New York city and for the rest of the State.

The first three months of 1918, figures for which are available at the time of writing, have been added. During 1917, there were reported from the entire State 483 cases; of these 322 were from New York city and 161 from the rest of the State.

There follows a similar chart (No. 7), presented for comparison, showing incidence by months in New York city and in the rest of the State, for 1916. During 1916, 327 cases were reported in the State, 256 from New York city, and 71 from the rest of the State.

During 1917, the case rate (per 100,000 population) for New York city has been somewhat higher than that for the rest of the State; 5.6 as compared with 3.4 upstate, the general seasonal trend of the incidence curve being the same.

There has been no apparent relation between the local prevalence of the disease and proximity to military camps. Broome county, with 11 cases, had a case rate of 11.5, the highest of the upstate counties. Erie county had the largest number of cases (63) and a case rate of 11. Niagara county followed, with a case rate of 6.1. Steuben, with five cases, had a case rate of 6.

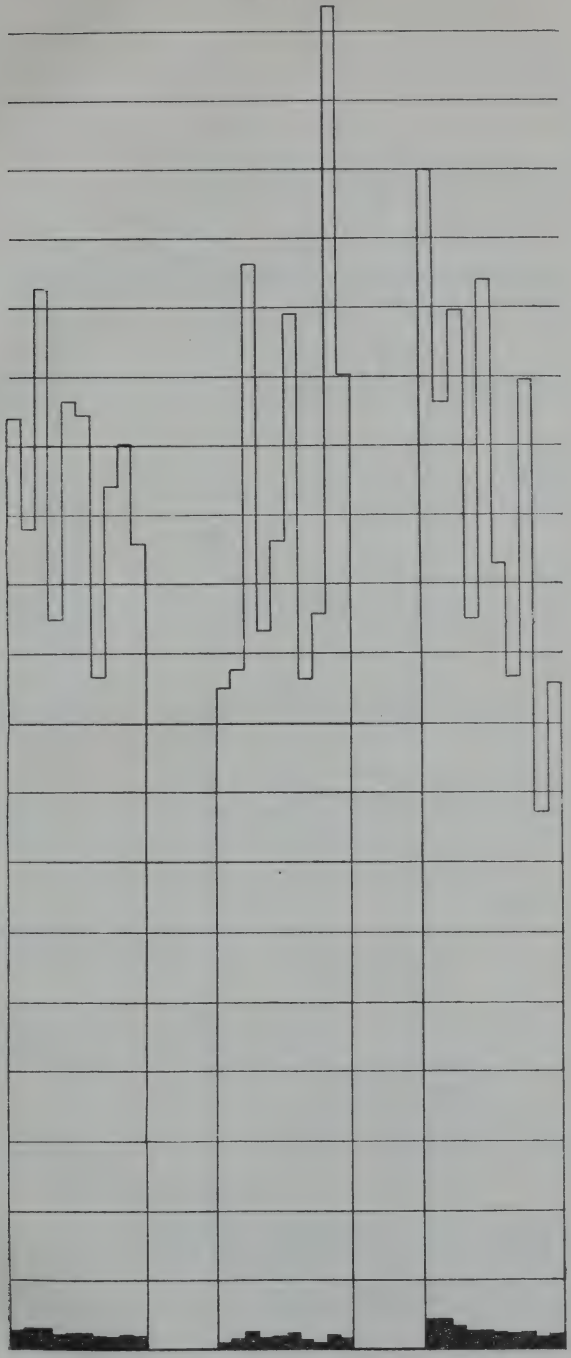
The death rate for the State as a whole showed a very slight increase over 1916 —.1 (per 100,000 population). On the other hand there was a decrease of .4 or 11.8 per cent over the five-year period 1911–1915. This decrease is no doubt largely due to the more general and early use of antimeningitis serum.

Measles

The case and death rates for measles for the entire State declined slightly from the excessive rates of 1916, the upstate decline being sufficient to overcome an increase in New York city. The upstate case fatality rate was practically the same as for the preceding year; that of New York city fell slightly. The case fatality rate of New York city has always been much higher than the upstate rate, and for the past two years has been higher than its own scarlet fever case fatality rate. A study of the upstate case and death rates, grouped according to the population of the political units, shows only slight differences between the city and rural rates for the year, although there is a progressive decline in the case fatality rates as the sizes of the units diminish. There are two exceptions to this general statement.

The influence of outbreaks in babies' hospitals is the most powerful one operating on the case fatality and indeed the death rate of communities in which they are located. It is not possible to say without further investigation how many of the thirty-six deaths which occurred in Rochester were institution inmates, but the excessive rate of Albany was due entirely to an outbreak in a maternity hospital and infants' home, which occurred early in the year, 23 of the 32 deaths in the city occurring in this institution. In the same way the case fatality rate and death rate of the group of cities of from 10,000 to 20,000 was made excessive by the occurrence of 52 deaths among 169 cases in a similar institution in Lackawanna. The case fatality rate for this group,

Chart 8



ANNUAL CASE AND DEATH RATES PER 100,000 POPULATION FOR MEASLES, 1908–1917 FOR ENTIRE STATE, NEW YORK CITY AND REST OF STATE.

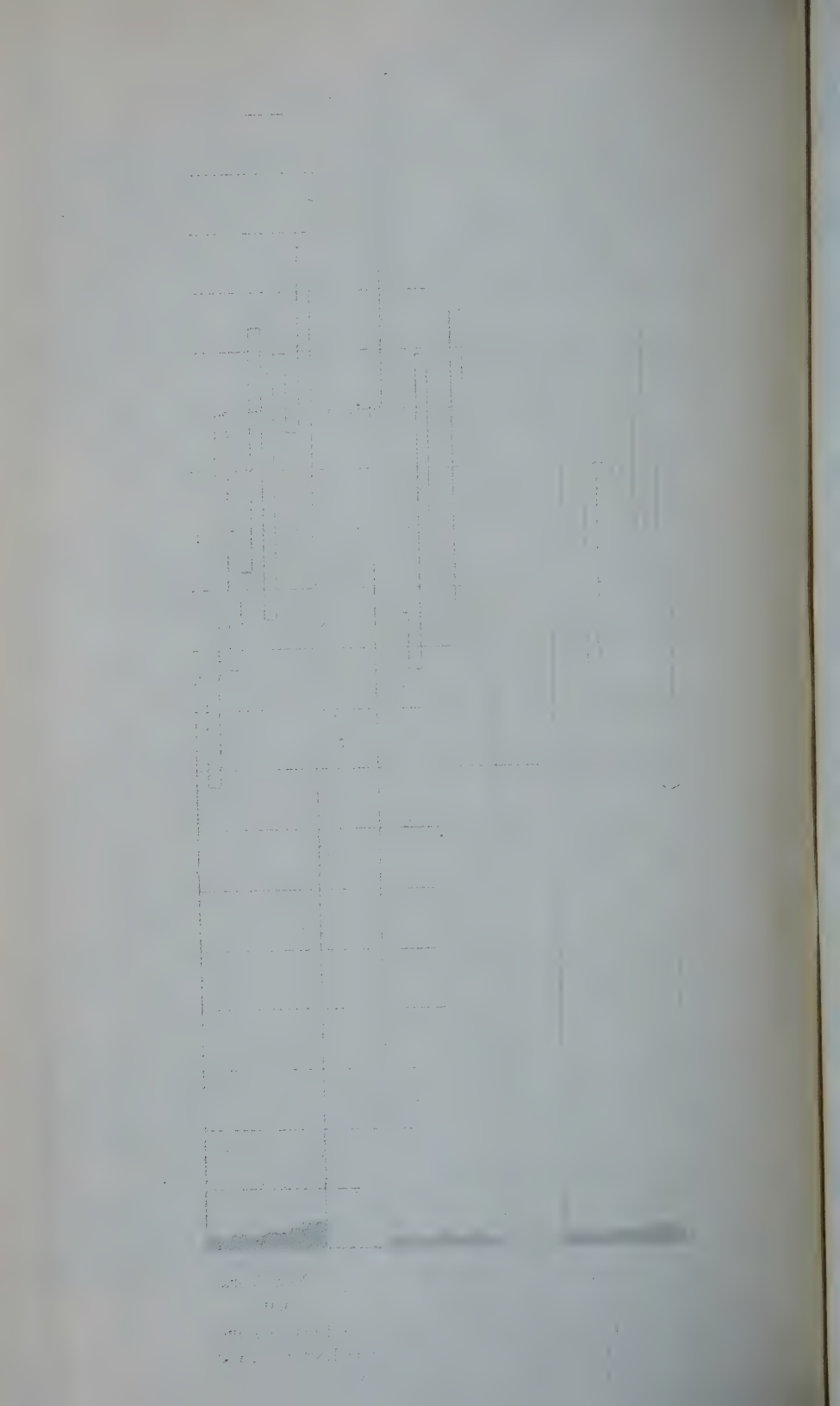


Chart 9

CUMULATIVE MONTHLY CASES OF MEASLES IN NEW YORK STATE, EXCLUSIVE OF NEW YORK CITY, 1914–1917 INCLUSIVE

excluding these institutional cases, was .27, and the death rate for the group was 2 per 100,000, as contrasted with 14.8 when the deaths of the institutions are included.

The lowest case fatality rate was in the smallest group of villages, where it was only .35, and the death rate per 100,000 was 4.0, practically equal to that of the 5,000 to 10,000 class. It was somewhat surprising to discover that both the death rate and the case fatality rate for the unincorporated towns was about equal to that of the larger cities, the bulk of the mortality occurring in Nassau, Oneida, Onondaga, Rockland and Suffolk counties. Two of the Nassau county deaths were in babies' institutions and all five of the deaths in Rockland county were the result of small outbreaks in such institutions.

An investigation of all the deaths showed that 15.6 per cent of them occurred in such institutions. Among the 57 cases which occurred in state institutions (insane hospitals, etc.) there were no deaths. These were of course older patients, and the small number of cases indicates that the disease never became epidemic in any of them.

The so-called periodicity of measles outbreaks is not discoverable in the rate for the entire State, perhaps owing to its composite character. The death rate for the State has shown a general decline during the ten-year period covered by the table, the decline being almost entirely due to the decline in the very high rates which formerly prevailed in New York city. The upstate rate has risen and fallen without any regularity in the intervals, though perhaps with as much as has been shown by some authors in their attempt to prove a periodical rise and fall in the death rates of various communities. The decline in the New York city rates seems to be due both to a decrease in the case rate and in the case fatality rate, the latter being probably more influential. It is not known to what extent this is due to keeping the disease out of infant asylums and providing better hygienic surroundings for tenement cases. It is probable, however, that both have had their effect.

The high mortality occurring in children's institutions points a way by which the death rate can be materially lowered by seeing that a proper period of quarantine is observed prior to the admission of new patients.

The ages of the decedents indicate the importance of preventing the disease in very young children, as postponement would undoubtedly save many lives. Munson's study of the outbreak occurring in a military camp in Texas (Military Surgeon, June-September, 1917) showed that the number of adults who had never had measles was approximately twice as great among residents of small villages and rural districts as among those having lived in larger communities. It is very probable that to some extent at least the lower case fatality rates in the smaller communities are due to attacks at more favorable age periods.

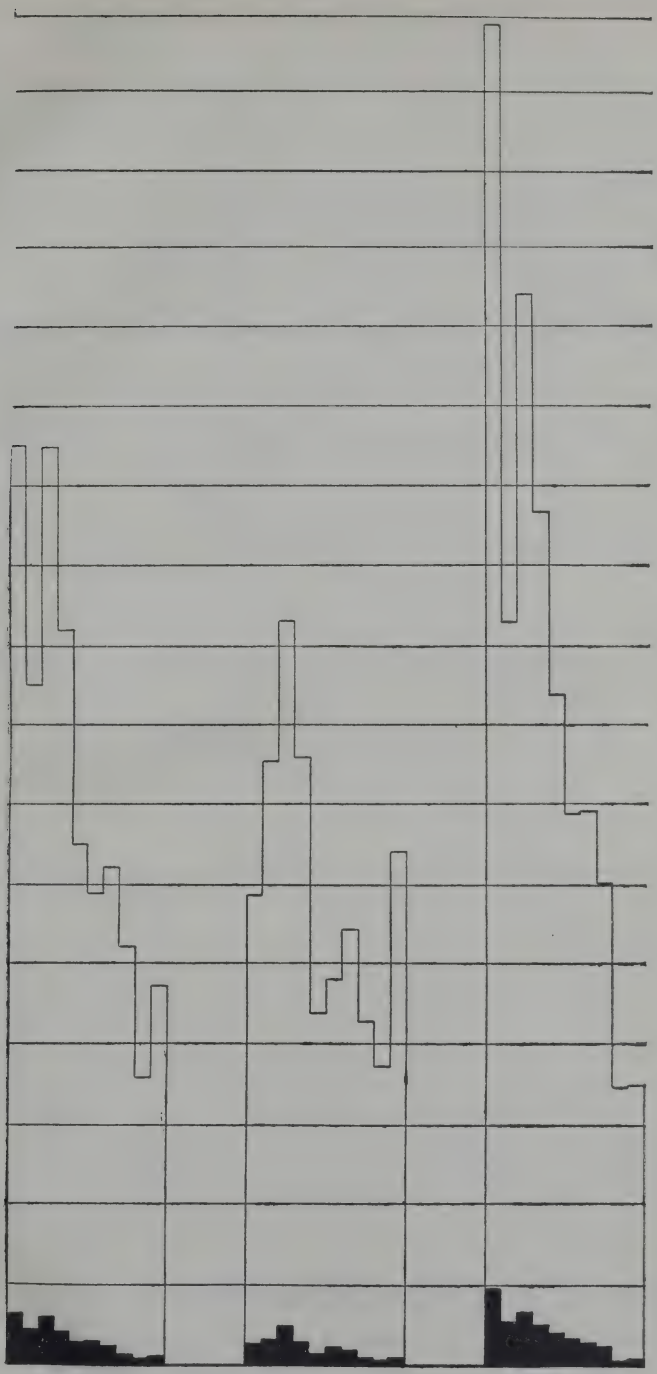
It will be seen from the cumulative graph (Fig. 37) that about 65 per cent of the measles morbidity occurs during the first five months of the year. It has been noted, however, that the earlier the curve begins its ascent in the fall or winter of one year, the higher the curve ascends in the early months of the succeeding year.

Scarlet fever

As will be seen from table 1, page 203, and the graph drawn from it (Fig. 10), the death rate of the State from scarlet fever has declined almost without interruption during the past ten years, although the rate for last year was approximately fifty per cent higher than for the preceding year. This increase occurred both in New York city and upstate, though it was more marked in the latter. The decline in the death rate has occurred despite fluctuations in the case rate, the decline in the case fatality rate being the most influential factor in the reduced death rate. This lower case fatality rate has been most marked during the past three years and has been observed both in New York city and upstate. The figures would indicate that this was not simply the result of better reporting of cases, but is due either to improved treatment or a less virulent type of the disease.

The cumulative graph shown in Chart 11 shows a marked parallelism with the measles curve and shows that approximately 60 per cent of the cases occurred during the first five months of the year. The curve inclines upward in the latter months of the year at a much sharper angle than the measles curve, possibly due to the shorter period of incubation.

Chart 10



Annual Case and Death Rates per 100,000 Population for Scarlet Fever, 1908–1917, for Entire State, New York City and Rest of State

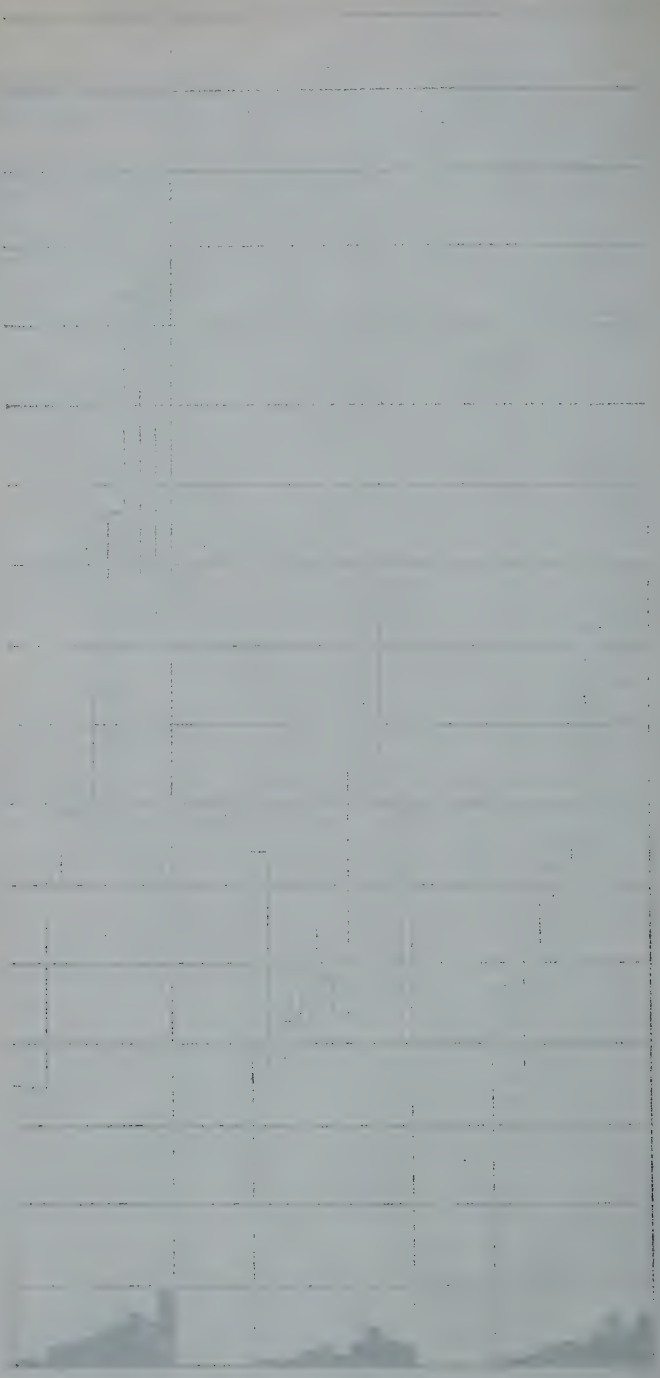
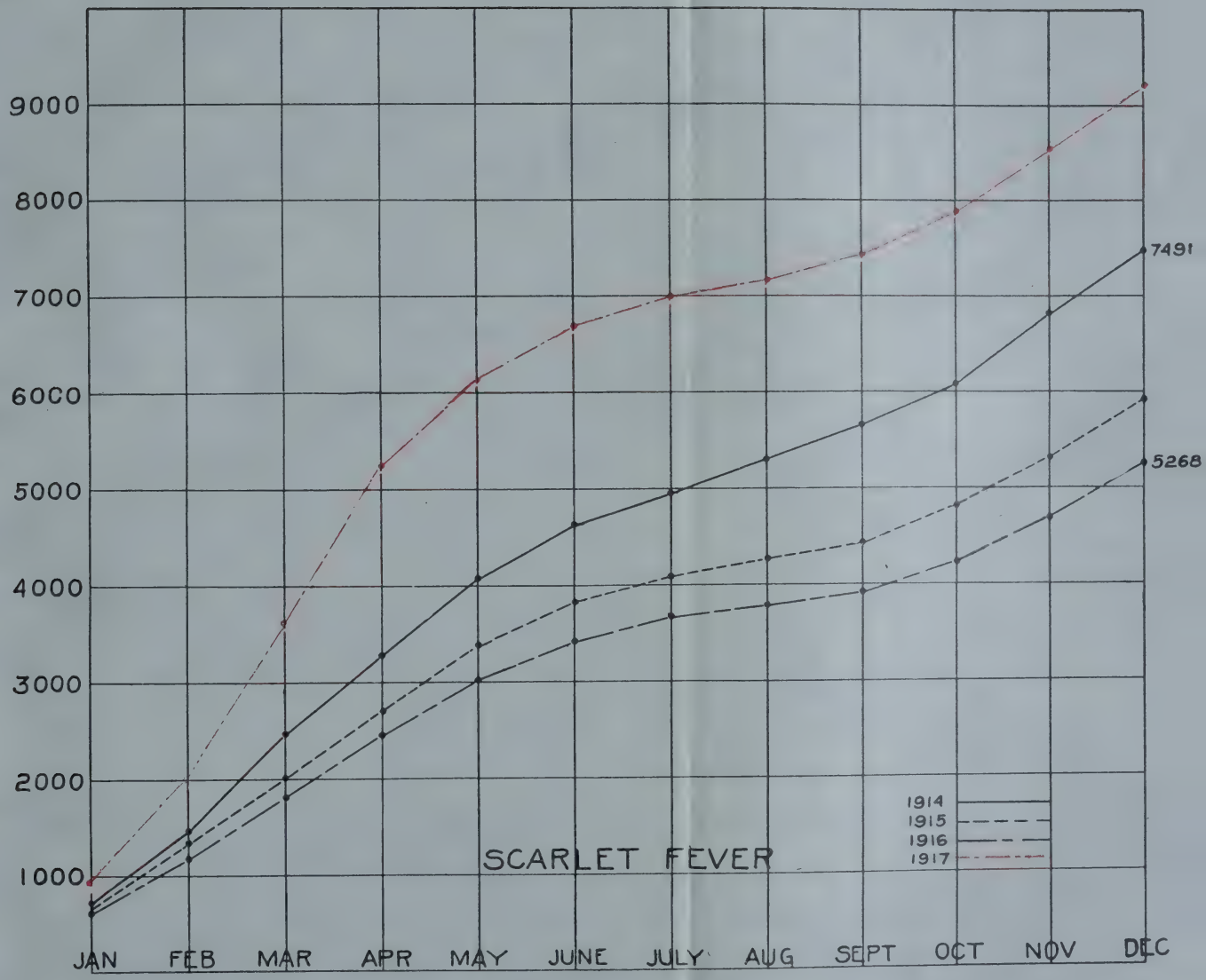


Chart 11



Cumulative Monthly Cases of Scarlet Fever in New York State, Exclusive of New York City, 1914–1917, Inclusive.

Whooping cough

The death rate from whooping cough has shown practically no change during the past ten years, the fluctuations in the death rate being much less marked than for measles. The New York city rate has shown rather more pronounced fluctuations than the upstate rate, and throughout the ten-year period covered by table 1, page 203, has risen and fallen in alternate years. This regularity is not observed in the upstate rate, which, while it has been lower during the past three years than was formerly the case, has yet declined so slightly as hardly to be worthy of notice.

The death rate for 1917 was exactly equal to that of 1916, despite a considerable increase in the case rate. The case fatality rate has, however, shown a marked decline since the disease began to be reported in 1911, but it is probable that this is in part due to more complete reporting of the cases. The case fatality rate of New York city has been usually very much higher than the upstate rate, though neither of them indicates that the reporting of the disease is complete.

Pneumonia

Pneumonia was not included in the list of reportable diseases during 1917, and there are therefore no case records on file. There were 18,677 deaths recorded in the State as a whole, 6,665 of these from bronchopneumonia, and 12,012 from lobar pneumonia or unclassified. Of this number 2,859 deaths from bronchopneumonia and 4,741 from lobar pneumonia (or not classified) occurred in the State outside of New York city.

There is appended hereto an account by Dr. Charles W. Berry, sanitary supervisor, and Dr. H. T. Chickering of Rockefeller Institute for Medical Research (published in HEALTH NEWS) on an interesting group of pneumonia cases.

LOBAR PNEUMONIA OF UNUSUAL COMMUNICABILITY

On May 22, 1916, at the request of the local health officer of the village of W———, who had been notified of the facts by the family physician, an investigation was made by the Sanitary

Supervisor of some cases of obscure illness of a very severe nature occurring in one household. The symptoms were so ill defined, so severe, and of such sudden onset, that in the absence of definite clinical findings, typhus fever was suspected by the attending physician.

There were six patients all related and living in the same dwelling, all with the same type of infection and stricken down a few days apart with very severe symptoms. Their clinical histories were briefly as follows:

1 On May 13, 1916, Mrs. D., age 34, living in W., was taken suddenly ill with vomiting, high fever, delirium and dry coated tongue. The family physician was called in attendance, no positive diagnosis being made at that time. A few days later severe pains in the legs and right side developed and some symptoms of pulmonary congestion (cough and rapid respiration), but nothing very definite was to be made out. (Mrs. D. was six months pregnant.) Later a heart complication developed — probably dilation — and the patient died on May 24, 1916.

2 On May 14, Gertrude D., age 4 years, was taken ill in the same manner and was still in bed on May 27. There was no pain in this case except in the legs; there were vomiting, fever, delirium, rapid breathing, herpes about the mouth and some indefinite pulmonary rales.

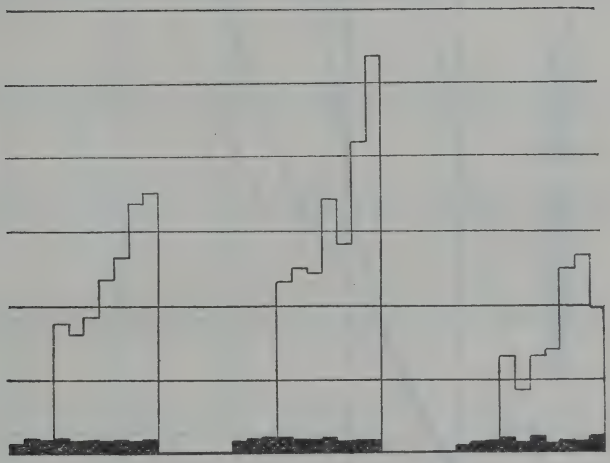
3 On May 18, Mabel D., age 14 years, was taken ill and was still in bed on May 27. There was rapid onset with vomiting and delirium, severe pains in the legs and right side, a cough with bloody expectoration, indefinite chest symptoms, no herpes.

4 On May 19, Arthur D., age 6 years, came down; the same onset of symptoms as the others but no herpes or pains in the chest; leg and body pains severe. On May 27, in bed delirious.

5 On May 19, Fred. D., age 20 months, was taken with vomiting, fever, cough and expectoration, rales in chest; he had nearly recovered on the date of visit.

6 On May 22, Floyd D., age 11 years, was taken suddenly ill with the same symptoms. An examination by the Sanitary Supervisor showed consolidation of the right upper lobe with a few crepitant rales and slight dullness. Child appeared very ill with

Chart 12



Entire State | Rest of State | New York City

ANNUAL CASE AND DEATH RATES PER 100,000 FOR WHOOPING COUGH, 1908–1917 FOR ENTIRE STATE, NEW YORK CITY AND REST OF STATE.

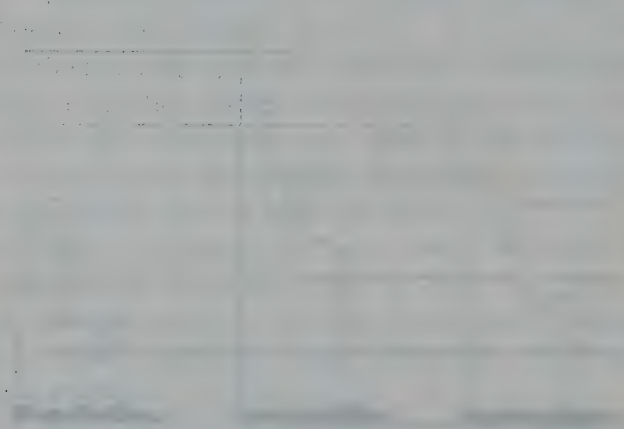
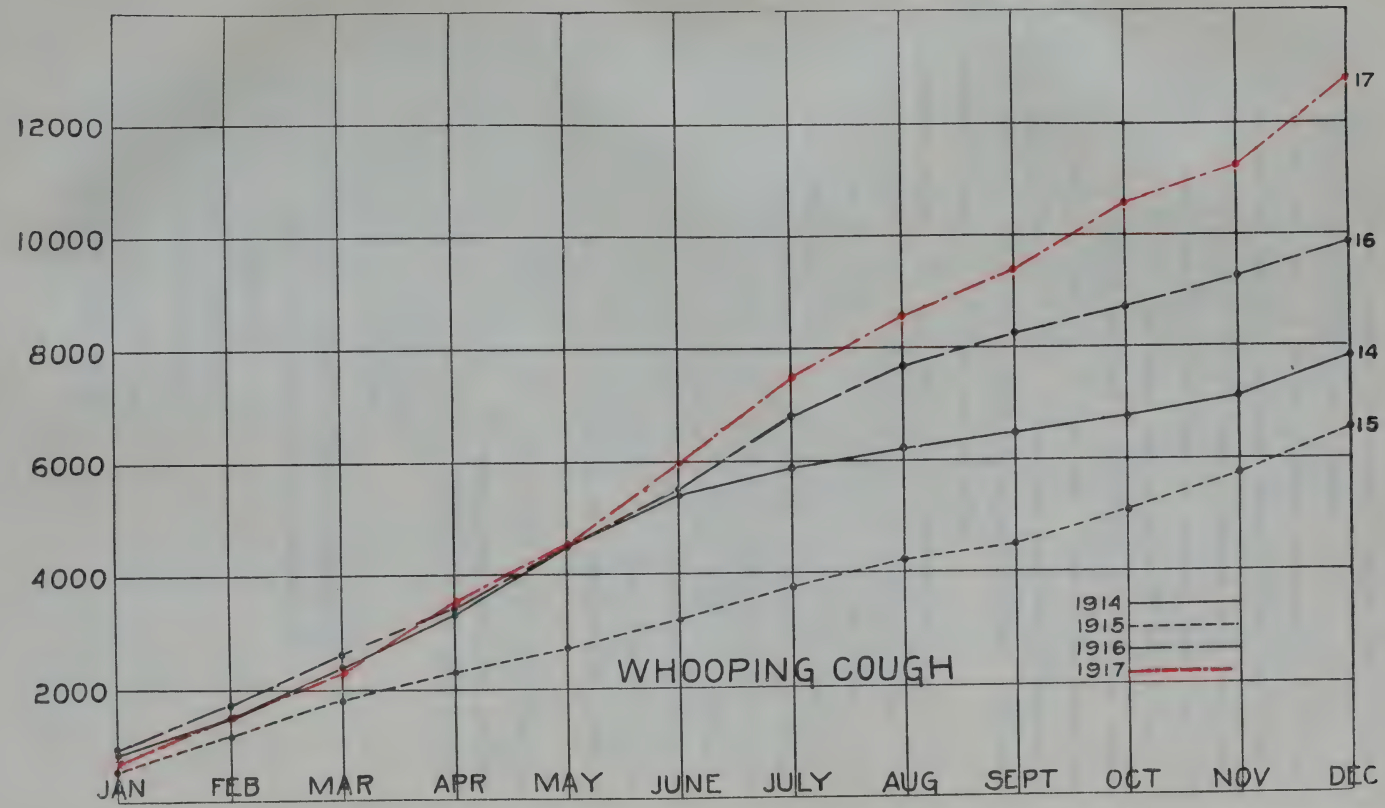
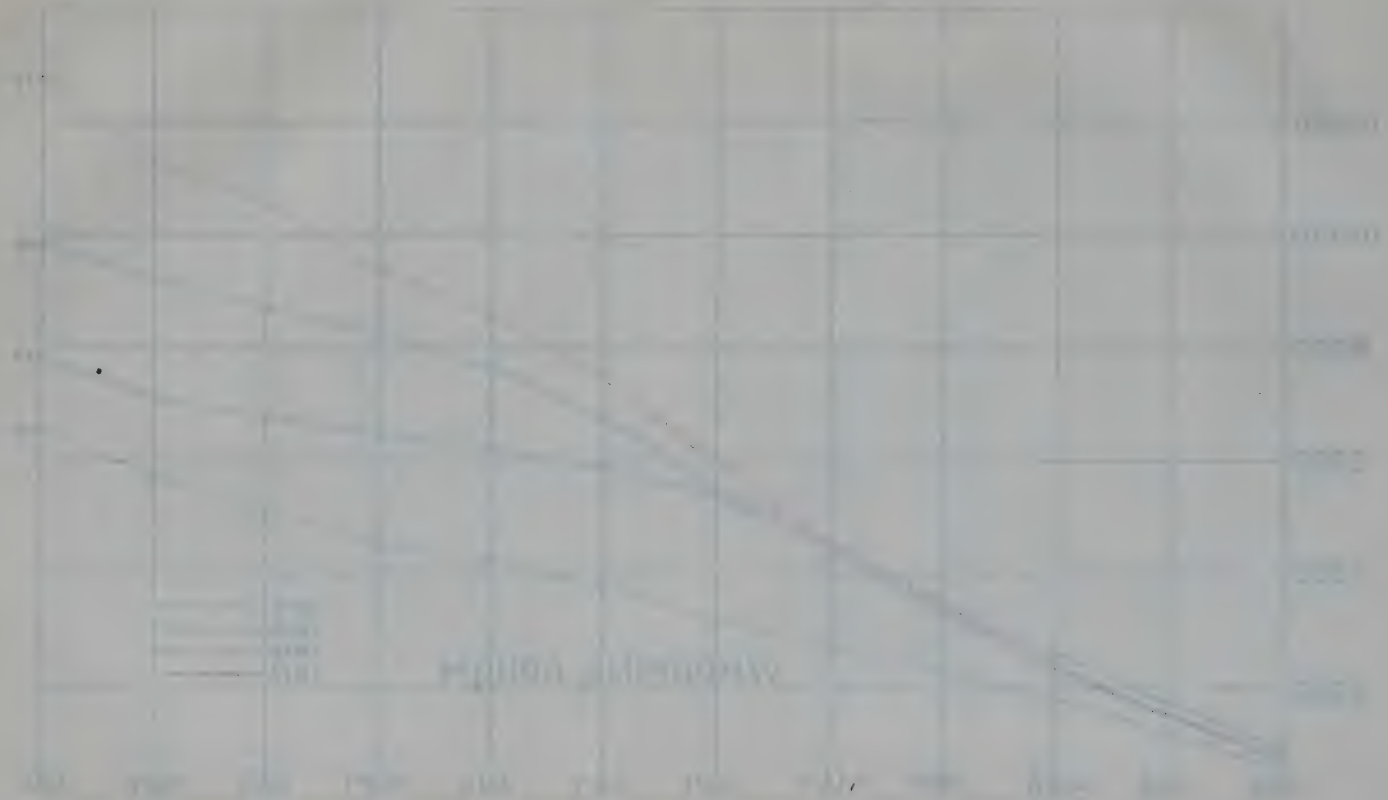


Chart 13



Cumulative Monthly Cases of Whooping Cough in New York State, Exclusive of New York City, 1914–1917 Inclusive.



considerable prostration, cough, dry coated tongue, pain in legs, mentality dull and active delirium at times.

There was no rash on any of the patients and a careful clinical examination elicited the facts as given above. The chief characteristics of the illness were the extreme virulence and ready communicability; everyone who had been in contact with the first case became ill. In all, the onset was rapid with high fever — 103° to 105°— vomiting and active delirium, dry coated tongue and muscular pains, especially in the legs. Two of the cases had marked pain on the right side. One case had well pronounced herpes of the lips. One case had bloody expectoration. Abdomen not distended or tender. Spleen not palpable.

Pulmonary signs: In one case signs of consolidation in right upper lobe, dullness, bronchial breathing and crepitant rales (this case was seen shortly after onset of illness); in the others more or less rude breathing, sibilant, and moist rales all over chest. Fever in all terminated by lysis. Widal reaction and smears taken for malaria were negative. A tentative diagnosis was made of pneumococcal infection, perhaps combined with B. influenza.

At the suggestion of Dr. Nicoll, Secretary of the State Department of Health, the Rockefeller Institute in New York city was communicated with and Dr. Chickering was assigned to make a bacteriological investigation.

The cases were revisited on May 26, in company with Doctors Chickering, Palen and Merritt. It was found that the mother had died two days before, two of the children were still acutely ill and the others were convalescing.

Specimens were taken as follows:

Blood in broth cultures from the two acutely ill
Blood for white cell count from two acutely ill
Blood smears from all
Throat cultures from three
Sputum from all in house

Results obtained were as follows:

Blood cultures, both sterile

White cell count:

Arthur — 19000 total white cells
76% Polymorph.
16% Mononuclears
8% Lymphocytes
Floyd — 91000 total white cells
84% Polymorph.
6% Small Lymphocytes
10% Large Monomuclears.

Blood smears negative. Throat cultures showed mixed strains of Gram negative and Gram postive diplococci.

BACTERIOLOGICAL RECORD

From the sputum of five of the six cases investigated was recovered a pneumococcus which corresponds in its immunological reactions to the pneumococci of Group 1.

At the time of the investigation three of these cases had been, and still were, suffering from pneumonia; the other cases — the father of the family and the nurse — were apparently healthy individuals who were in close contact with the patient. The sputum of the baby, Fred, showed streptococci.

The influenza bacillus was also present in the sputum of some of the cases. This organism is so frequently found in sputum from many pathologic conditions that its presence in these cases should not be accepted as necessarily a factor in having caused the disease or influenced the course of it.

So far as is known at the present time this series of six cases of acute lobar pneumonia, apparently caused by pneumococci of the same type and spread from one person to another by direct contact, is unique in the epidemiological records of the disease.

Smallpox

The following is a summarized report covering the prevalence of smallpox in the State, prepared by the writer for HEALTH NEWS (March, 1918), with corrections made necessary by receipt of delayed reports:

"Smallpox" is a word startling to the average individual, and to those familiar with the history of the disease brings to mind visions of yellow

flags, armed guards and neglected victims dying by thousands or left with faces pockmarked as the result of its ravages. While universal vaccination has robbed it of most of its terrors, it is well to bear in mind the fact that if our sense of security leads to a neglect of general vaccination, it may again secure a foothold, and assume some of the characteristics which formerly made it the most dreaded of all scourges.

It is reasonable to assume that at the close of the present world war there may be an influx of immigrants from countries in some of which smallpox is still a scourge. Even the vigilance of the guardians of our ports will not assure safety to an unvaccinated generation against the entrance of persons bringing with them fresh and virulent strains of the organism causing the disease.

CASES OF SMALLPOX REPORTED IN NEW YORK STATE, 1914–1917, INCLUSIVE

	New York City	Rest of State	Total
1914	24	767	791
1915	2	153	155
1916	7	23	30
1917	14	348	362

The first case of smallpox reported "up-state" in 1917, occurred at Union, Broome county, in January, the patient being a negro who had been closely associated with negro laborers brought from the south shortly before. The case was promptly diagnosed and all nonimmune contacts vaccinated. No further cases occurred locally, but in the following month a case was discovered at Bath, the patient apparently having received his infection at Union.

During the spring and early summer scattered cases occurred, notably in certain Hudson River counties and in western New York. In each instance, as a result of the joint efforts of state and local health officials in locating contacts and promoting general vaccination, outbreaks were controlled and nowhere did they assume epidemic proportions. Most of these local outbreaks were directly traceable to imported cases. The disease was prevailing extensively in and about Waterbury, Connecticut, whence it entered New York State in several instances. The primary case in one instance came from Massachusetts, while others were from Canada, from Ohio and from Pennsylvania. In April, infection in a group of cases in Buffalo was traced to an employee of a traveling opera troupe.

In June, a local health officer whose district adjoins the Cattaraugus Indian reservation discovered a well-developed case in an Indian on the reservation. An investigation revealed the fact that a number of undiscovered cases existed there, and that a large number of Indians, and possibly many people residing nearby, had been exposed. As a result of the vaccination of some 1,500 Indians and general vaccination in the villages adjacent to the reservation, reinforced by a vigorous quarantine, the outbreak was limited to 101 Indians, nearly all previously unvaccinated, who had been exposed too early to be protected. The first case is believed to have been an Indian who developed the disease shortly after being discharged from the Buffalo penitentiary.

The disease was carried to the Allegany reservation by an Indian who left the Cattaraugus reservation before quarantine was established. This case was promptly discovered, and but seven cases resulted therefrom.

Smallpox has prevailed to some extent in Buffalo since early spring and during October and November, 13 cases were discovered in Niagara Falls. Several scattered cases have occurred during the fall and early winter in towns adjacent to Buffalo.

Early in November the disease made its appearance in central New York, the first case found being at Rome. Shortly after cases came to light in Utica. Upon investigation it was found that apparently the first case had been a bellboy, who had been ill some time before. He had infected a sister, who in turn had been responsible for two other cases in a school attended largely by children of Italian parentage. Up to February 1, 47 cases had occurred. Several thousand vaccinations have been performed, and the outbreak is regarded as under control, notwithstanding the fact that a very large number of exposures had occurred before the situation came to the attention of the health authorities.

By February 1, 95 cases had been discovered in the county, 78 of them in the town and village of Frankfort. Its control, in the midst of a large and constantly changing industrial population, has required united and vigorous efforts on the part of health officials and has been accomplished with the cordial cooperation of school and public officials, of employers and employed.

Smallpox is prevailing not in New York State alone. In spite of vigilance, those who travel or who mingle with others may at any time come in close contact with persons capable of transmitting the disease. Within the past few weeks a salesman suffering from the disease traveled over several counties before his condition was discovered. With the possibilities so clearly before us, "a word to the wise" should be sufficient.

The epidemic which occurred at the Cattaraugus Indian Reservation, mentioned in the foregoing summary, deserves special comment.

The reservation is sixteen miles long and about two or three miles wide and covers an area of approximately fifty square miles. It lies in three counties, Cattaraugus, Chautauqua and Erie, in five different townships, and its confines border upon five villages, the largest of which is Gowanda. There are about sixteen hundred Indians of various tribes residing upon the reservation.

When information regarding the presence of smallpox was received from Dr. H. F. Senftner, the sanitary supervisor stationed at Buffalo, Dr. J. J. Mahoney, sanitary supervisor at Jamestown, and Dr. Edward S. Godfrey, Jr., epidemiologist stationed at Albany, were directed to cooperate with him in the suppression of the outbreak, a state nurse being assigned to assist.

When the news of the presence of smallpox spread abroad, there

was considerable apprehension among the white population in the adjacent towns. In part, as the result of the natural stoical and taciturn disposition of the Indian, many mild cases of smallpox had occurred before the presence of the disease was discovered. Many of the Indians were employed as laborers upon farms and in the nearby villages. A few who had been exposed and were unvaccinated, as already mentioned, had left the reservation prior to the investigation.

As a majority of the Indians who were ill or whom it was necessary to quarantine as contacts were made indigent thereby, it became necessary to provide immediately for care and maintenance, as well as to provide guards to prevent unvaccinated persons leaving the reservation.

Poor law officials of towns in which Indian reservations are located are empowered by law to defray expenses incidental to epidemics of communicable disease, the law further providing that the State Commissioner of Health may reimburse them for such expenditure. A joint meeting of the various town boards with the state health officials was called to consider "ways and means." In view of the extent of area of the reservation and the wild character of the country thereabouts involving the necessity for a large number of guards, and of the number of exposed individuals and the likelihood of many becoming indigent when incomes from daily labor were temporarily discontinued, it was obvious that the local expense of controlling the outbreak and caring for the Indians would be large. On this account and because of an unfortunate experience which one of the boards had had before the enactment of the law authorizing reimbursement by the State Commissioner of Health, the local officials were reluctant to assume responsibility. This they finally agreed to do, however, and they have since been reimbursed. This incident is related as pointing to the need for more definite and workable laws than now exist in regard to control of outbreaks of communicable disease upon reservations. It may be noted in passing that the expenditure for which local officials have been reimbursed in this single outbreak have amounted to approximately seven thousand dollars.

Here, for the first time, was demonstrated the value of the

state constabulary as an agency for the protection of life and health. When it was found practically impossible to secure an adequate number of men who could be depended upon to perform fearless and efficient service as guards, six troopers were assigned by the superintendent of State Police to this duty and their services proved highly effective.

Through the cooperation of the State Department of Education, vaccination centers were established at the reservation schools and approximately 1,500 of the 1,600 residents of the reservation, most of whom were unvaccinated, were vaccinated. Throughout the epidemic the Indians generally, and particularly the council of the Seneca Nation, cooperated cordially in its control.

While the outbreak was in progress, vaccination was performed very generally in the surrounding towns and villages.

The 348 cases of smallpox which occurred during 1917 in the State outside of New York city were distributed by race as follows:

White	180
Indian	108
Negro	32
Unstated	28
Total	348

The following table presents the vaccination history for the 348 cases reported outside of New York city.

RECORD OF VACCINATION IN REPORTED CASES OF SMALLPOX 1917, NEW YORK STATE, OUTSIDE OF NEW YORK CITY

Vaccinated within seven years	2
Vaccinated over seven years ago	25
Never vaccinated	321
Vaccination history uncertain	
Total	348

During the year, 14,386 vaccinations were reported. It is believed that many vaccinations have been performed reports of which have not been made to this Department as required by

section 311 of the Public Health Law. Many reports received do not indicate whether or not vaccination was successful. A special effort is being made to enforce this section of the law and to encourage physicians performing vaccinations to ascertain whether or not such vaccinations have been successful before making reports. The following item which appeared in the January, 1918, number of the HEALTH NEWS is of passing interest:

AN AMBULATORY SMALLPOX CASE

The following incident strikingly illustrates the possibility of mistaken diagnosis in smallpox, the serious results which may follow failure to report so-called "minor" communicable diseases, and the difficulty of preventing the spread of smallpox in the absence of general vaccination.

A traveling salesman, calling upon physicians and coming in contact daily with a large number of people, became ill on January 2, while stopping at a hotel in Jamestown, N. Y. From the third to the fifth day of the month he was attended by a physician who treated him for "grippe." On the morning of January 6, he felt better and continued his travels, stopping at hotels in Olean, Bradford and Salamanca within the next few days. On January 9, while at Portville, he noticed an eruption and is said to have casually consulted a physician, who advised him that his eruption resembled chickenpox but allowed him to continue his travels, and apparently did not report the case. On January 10, at Cuba, it is stated that he again called the attention of a physician to his eruption. The physician suspected smallpox and later called the attention of a sanitary supervisor to the case, but permitted the man to leave, and apparently did not report the case to the local health officer.

The sanitary supervisor started an investigation which resulted in the man being later located at Olean. Just prior to the arrival of the information from the sanitary supervisor, two Olean physicians had made a diagnosis of smallpox. Later this diagnosis was confirmed by the sanitary supervisor and by several other local physicians. It was found that the man had never been vaccinated.

The incident should serve to impress upon physicians the importance of regarding all cases of "grippe" and chickenpox as suspicious at a time when smallpox is prevalent, especially if associated with severe backache and headache. It indicates clearly that failure to comply with regulations of the sanitary code relative to reporting communicable diseases may lead to serious complications. Incidentally, no better argument is needed to convince laymen of the decided advantage of being protected against smallpox by vaccination.

Typhoid fever

During the year, 4,293 cases of typhoid fever were reported, 1,442 of these from New York city, 2,851 from the rest of the state. There were 591 deaths from the same cause, 229 occurring in New York city (see special report, page 184).

Among the various upstate counties, by far the highest case rate prevailed in Albany county, which had a case rate of 223 per 100,000, the next highest being Greene county with 130 per 100,000, and the lowest being Wyoming county with 6, and Nassau with 11. The excessive rate in Albany county was largely due to a prolonged outbreak which occurred at Watervliet, a city of approximately 14,000 population.

Inasmuch as this was the most important, and incidentally the most troublesome, typhoid outbreak which occurred during the year, the complete report of the investigation of Dr. Edward S. Godfrey, Jr., epidemiologist, is here presented:

TYPHOID FEVER IN WATERVLIET

The city of Watervliet, Albany county, having a stationary population of almost exactly 15,000, has suffered from an excessive typhoid rate for many years past and has gone through three epidemics in the past five years. About the 15th of September, 1917, attention was called to the fact that 16 cases had been reported since the 1st day of the month; 13 additional cases were reported on the 17th through the Watervliet and Troy Health Departments.

A preliminary investigation by Dr. Duryee, the sanitary supervisor of the district, showed that a very large proportion of the cases were located in a district bounded by the Arsenal wall, north to Fourteenth street and from Broadway west to Fourth avenue. Dr. Duryee found that a very large percentage of the cases did not drink city water but used water from one or all of three wells located at Second avenue and Thirteenth street, Third avenue and Thirteenth street and Third avenue and Fourteenth street, respectively. The members of these families, however, as a rule did use city water for domestic purposes.

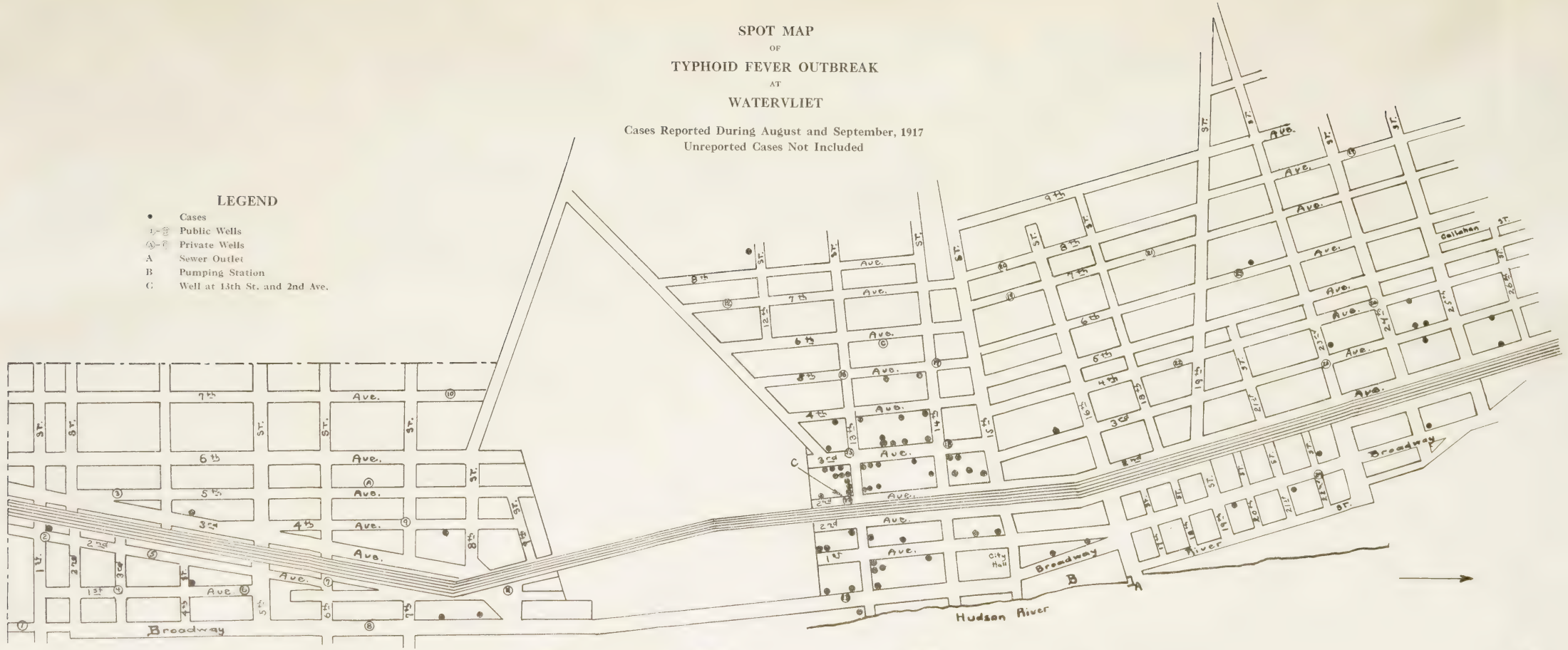
In times past the general water supply of the city has been held accountable for the high typhoid rate and it was assumed prior to Dr. Duryee's investigation that this was the case in the present instance. The Engineering Division accordingly began an investigation of the general water supply simultaneously with Dr. Duryee's investigation of the cases, leading to the discovery of certain facts which will be noted later. Inasmuch as an under-

SPOT MAP
OF
TYPHOID FEVER OUTBREAK
AT
WATERVLIET

Cases Reported During August and September, 1917
Unreported Cases Not Included

LEGEND

- • Cases
- ①–⑩ Public Wells
- Ⓐ–Ⓕ Private Wells
- A Sewer Outlet
- B Pumping Station
- C Well at 13th St. and 2nd Ave.



standing of the water supply of the city is essential to an understanding of the outbreak, the following brief description is given.

The water supply of Watervliet is derived from a public supply pumped from the Hudson and Mohawk rivers, from 23 public wells, and from a large number of wells located on private property. Three of the latter are used so extensively by the public that they may be classed as public wells.

The public water supply is derived in largest part from the Mohawk river at Dunsbach Ferry, about sixteen miles distant, from which about two and one-half million gallons per diem are pumped into a reservoir located on a height west of the city. The investigation by the Engineering Division disclosed the fact that owing to a breakdown in the pumping station at this point it was necessary to install an auxiliary supply from the Hudson, the latter being put into operation July 24. This pumping station was located between Broadway and the river bank about midway between Fifteenth and Sixteenth streets. A sewer empties into an obsolete ferry slip about one hundred and fifty feet above the intake. Other sewers empty at varying distances above and below. A similar condition had led to installing such an auxiliary supply from the Hudson in the spring of 1916, at which time the plant was located four or five hundred feet south of the city limits a fact of some significance as the typhoid incidence at that time was in Port Schuyler or that part of the city south of the Arsenal.

The public wells are all located on the streets or sidewalks, the waste water running into the gutters or standing in puddles about the bases of the pumps. The pumps themselves are in many instances of wooden construction and venerable aspect. The more recent installations have been iron pumps. The tops are usually fairly well protected by flags, the iron pumps being bolted to boards laid across the flags.

In most instances the city sewers, constructed of vitrified tile, follow the centers of the streets. These sewers carry both domestic sewage and storm water and the joints are supposed to be laid with cement, but in a number of instances where the sewers have been dug up, the ground about the sewer has shown evidence of leakage. Usually, too, the sewer has been found to be laid in

shale, offering an excellent opportunity for underground pollution of wells even at a considerable distance.

The wells, with the exception of the Beattie well and the well at Seventh avenue between Seventh and Eighth streets, are simply dug wells with no protection from ground water. Some of them have required some blasting, but the depth and the particulars as to the strata penetrated in their fabrication are unrecorded. The danger of pollution of such wells from leaking sewers within fifteen to fifty feet is an imminent one, and despite the fact that not all of them can be held responsible for the typhoid infection in the past, there is no reason why they may not become such a source in the future with the two exceptions noted above. The analyses of the waters from these wells show present or past pollution and their proximity to sewers renders it reasonable that it is from them they receive their contamination.

A notable exception to the proximity of sewers is found in the well at Second avenue and Thirteenth street. This well, which is held responsible for a large group of cases, is at the edge of the sidewalk about fifty feet from the canal bank and one hundred feet from Thirteenth street. There is no sewerage either on Second avenue or Thirteenth street at this point. The nearest sewer is on Third avenue about three hundred feet distant, up a rather steep incline. A number of privies exist in this block, which is in reality located on a hillside. The storm sewer from the northern and western part of the city carrying storm water only, courses under the Erie canal at Thirteenth street about one hundred and seventy-five feet distant from the well and at a depth probably greater than the depth of the well itself. Even had this sewer carried domestic sewage, it seems impossible that it could have been the source from which this well was infected.

As to the Hudson and Mohawk supplies, both are of course from highly polluted sources and were treated with liquid chlorine, the rate of application prior to September 17, 1917, being supposedly about .33 parts per million. On this date samples taken by the Engineering Division showed a bacterial count of 66,000 in the raw water and 55,000 in the chlorinated water, with colon bacilli in all dilutions, clearly indicating that the chlorine was insufficient to produce any appreciable results in the reduction

of the bacterial content. The quantity of chlorine was increased from day to day on the basis of an examination for free chlorine, and the samples taken on the twenty-second of September gave the first satisfactory bacterial analysis.

Watervliet's death rate from typhoid fever has been consistently high as shown by the following table. The upstate rates for the corresponding years are given for comparison.

YEAR	Deaths	Rate	Upstate rate
1912	5	33.2	14.1
1913	11	73.2	14.5
1914	5	33.3	11.9
1915	6	40.0	9.5
1916	5	33.4	8.3
5 year average	6.4	41.6	.....

The above rates are prima facie evidence of a polluted water supply. As a matter of fact, the disease is endemic in Watervliet and almost every year rises at some time or other to epidemic proportions. The death rate is in reality much higher as a considerable number of the severe cases are taken to hospitals in Troy or Albany for treatment. The records of the registrar of vital statistics at Troy show that since 1913 the following number of deaths from typhoid have occurred in Troy among residents of Watervliet:

1914, 4; 1915, 2; 1916, 2.

Adding these, the typhoid death rates for these years are:

1914, 60.00; 1915, 53.3; 1916, 46.7

Prior to 1913, the certificates of death failed to show the usual residence of decedents and one can but surmise the actual loss of life from typhoid among residents of this community. Even this does not tell the entire story, for many residents of Troy, Albany and smaller places in the vicinity work in Watervliet and contract typhoid there.

The unusually high death rate of 1913, was due to a flood of the Hudson river which inundated a large part of the city lying east of the Erie canal and infected the wells lying in that locality. This flood also probably contributed to an increase in the infection in the general water supply itself.

Although the death rates above given are quite high and would be higher if the typhoid deaths attributable to Watervliet but occurring elsewhere were added, it is probable that even this "corrected" rate would be less than the truth, through failure to accurately diagnose atypical cases of the disease. Seemingly but few of the physicians of the city used a Widal reaction for the purpose of identifying their continued fevers and most of these failed to send more than one specimen of blood to the laboratory for this purpose. Instances were encountered of cases diagnosed as malaria, grippe, gastric ulcer, etc., which were in the immediate families of cases of typhoid and recounted histories indicating that a Widal would have been of extreme interest.

The preliminary investigation by Doctor Duryee above referred to excluded milk and any common food product and the explosive character of the outbreak eliminated flies, contact, et cetera, from consideration except as minor sources.

Although few cases of typhoid were reported during early September from the northern and southern parts of the city — the latter known as Port Schuyler — in the latter part of the month there was a considerable increase in cases occurring in the district north of Nineteenth street and as far west as Fourth avenue. The public wells were blamed in the minds of a number of people for this increased incidence but it did not seem reasonable to believe that such a considerable number of wells could be simultaneously infected with typhoid organisms. It appeared much more plausible on the face of things to attribute this increase of infection to the city water supply.

In all one hundred and sixty-nine discovered cases were investigated, not including several cases reported from Troy as having received their infection in Watervliet. An analysis of the data collected by personal visits of representatives of the State Department of Health very clearly showed:

1 The presence of some unusual condition in the neighborhood of Thirteenth street, Second and Third avenues.

2 That milk, food, flies and contact were not responsible for the outbreak.

3 That but three explanations for the outbreak could be considered as solving the problem, namely:

SPOT MAP

OF

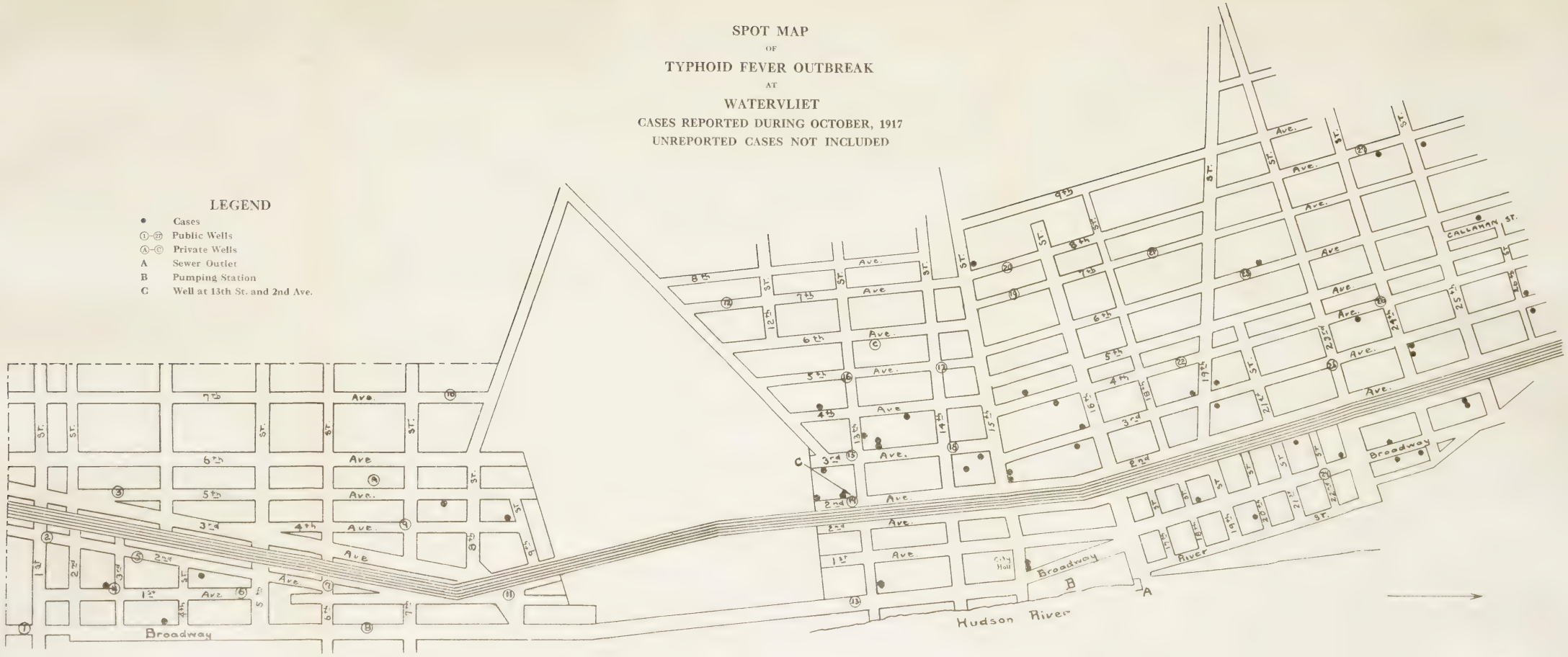
TYPHOID FEVER OUTBREAK

AT

WATERVLIET

CASES REPORTED DURING OCTOBER, 1917

UNREPORTED CASES NOT INCLUDED



(a) That the city water supply was the sole source of infection, and for some reason connected with the flow of water through the mains in the Second avenue and Thirteenth street district received a larger portion of the highly polluted Hudson supply than other parts of the city.

(b) That the three wells at Second avenue and Thirteenth street, Third avenue and Thirteenth street, and Third avenue and Fourteenth street had each been simultaneously infected with typhoid organisms.

(c) That one of these wells, probably that at Second avenue and Thirteenth street, had become suddenly infected and was responsible for the appearance of the large number of cases in this neighborhood, and that there had been superimposed upon this a general infection of the city water supply.

A study of the water supply system at first lent some color to the first possibility as cases were then occurring in the northern part of the city and seemingly followed a large main running along Broadway. The city map also showed a large main running off Broadway up Thirteenth street. Subsequently it was found that the map was inaccurate and that the actual size of the main on Thirteenth street was four inches smaller than that shown in the drawing.

As to the second possibility, it was not impossible that a sudden storm, taxing the sewers to their capacity, should cause an excessive leakage in the sewers and result in a sudden large infection of the wells at Third avenue and Thirteenth street, and Third avenue and Fourteenth street, and that through some fissure this infection reached the well at Second avenue and Thirteenth street almost at the same time.

However, the third possibility seemed the most likely and reinvestigation of some of the early cases whose record cards stated they had obtained water only from the Third avenue and Thirteenth streeet and the Third avenue and Fourteenth street wells, verified the suspicion that the information was incomplete. As a matter of fact the Third avenue and Fourteenth street and the Third avenue and Thirteenth street wells were both out of commission at different periods during the latter part of July and through the month of August, and the latter was permanently

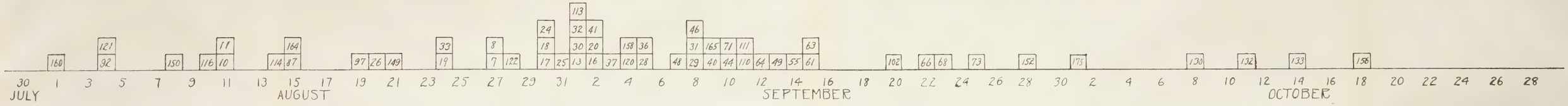
disabled by a break in the pump on the twenty-first of August. It was the custom of the neighborhood to resort at such times to the Second avenue and Thirteenth street well for their water as this was a never failing source of supply and the water was cold and deemed of an excellent flavor.

A study of the chronology of the cases indicates that the permanent breaking down of the Third avenue and Thirteenth street pump, leading to the excessive use of the Second avenue and Thirteenth street well, was the immediate cause of the large number of typhoid cases which developed in the succeeding three weeks. The extraordinary drain upon the Second avenue well undoubtedly brought water to it from an unusual distance and with unusual rapidity. In consequence there was greater opportunity for pollution and for the survival of typhoid organisms, thus enhancing the infectivity of this source of supply. In a number of instances the relationship between the change of water supply and the onset of illness was remarked by the people themselves. One woman in commenting on the breakdown of the Third avenue and Thirteenth street pump said: "That is what started all the trouble."

About two weeks after the investigation started, a case of admitted but unreported typhoid was discovered in the house in front of which the Second avenue and Thirteenth street well is located. It was learned that a previous case of probable typhoid with onset on August 1 had occurred in this patient's sister. This sister's case was diagnosed as malaria (without a blood examination) and the stools were not disinfected but were thrown into a privy on the back of the lot about one hundred feet distant from the well itself. There is a pronounced slope to the yard of this house down hill to the well and the soil of this region is a loose shale permitting of rapid percolation through fissures from considerable distances. It is highly probable that this was the source of the infection of the well. The woman with the original case apparently received her infection through bathing in the polluted water of the Hudson.

It is not believed that the Third avenue and Thirteenth street and the Third avenue and Fourteenth street wells were infected, although an analysis of the latter showed undoubted pollution and both are unquestionably exposed to it. The few cases which

CASES IN 13TH STREET DISTRICT. 2nd Ave. and 13th Street Well Water Users. Secondary Cases Not Included. By Dates of Onset.



CASES IN ENTIRE CITY. By Dates of Onset.

obtained their water from these supplies only, can be accounted for on the basis of the general infection of the city water supply, the failure to remember an occasional glass of water taken from the Second and Thirteenth street source, or an unwillingness on the part of some to admit their having drunk from that supply.

The record of the cases shows that of the 35 discovered cases having their onsets in the month of August, 22 primary cases were users of the Second avenue and Thirteenth street well. Two other cases were also users of this water but their onsets occurred a week or more after the beginning of the primary case. The remaining eleven cases were scattered over the entire city but principally in the region north of Nineteenth street.

The 169 discovered cases which were investigated (residents of Watervliet only) derived their water supply either solely or in part from the general water supply, from bottled water, or from one or more of 26 wells, six of which were located on private property. Of these the ones most frequently used were: The Second avenue and Thirteenth street well, as stated above; the Third avenue and Thirteenth street well; Third avenue and Fourteenth street; Fourth avenue and Twenty-fourth street; Sixth avenue and Nineteenth street; Twenty-second street and Broadway; city water and bottled water.

An analysis of the combinations in which these waters were used shows that 69 gave a clear history of having drunk water from the Second avenue and Thirteenth street well, while of four others there was greater or less doubt on this point. This is the largest single source from which the water supply of cases was obtained, and it was stated to be the sole water supply in 21 instances, outranking by nearly three to one its nearest competitor in this respect, bottled water.

The Third avenue and Thirteenth street well could practically be ruled out as it was used in conjunction with the Second avenue and Thirteenth street well in 26 admitted instances, one doubtful, and with the city water supply and Second avenue and Thirteenth street well in two instances, and was the sole source of supply in but one instance. It was admittedly used by thirty-one of the cases, one doubtful, leaving three cases in which it was not used in conjunction with a pretty well established source of infection.

The Third avenue and Fourteenth street well was used admittedly by 27 cases, one doubtful. In 19 of these cases it was used in conjunction with the Second avenue and Thirteenth street supply, and in two instances with the city water supply, leaving six instances in which it was not used with one of the established sources of infection. Even these cases were not confirmed owing to inability to find a responsible person at home. From other cases it is probable that this number would be reduced through failure to ascertain that the Second avenue and Thirteenth street well water was used. The Third avenue and Fourteenth street water was said to be the only source of supply in three instances; a manifest error when it was generally agreed amongst the users of the well that it was dry at different times during the summer.

The Twenty-fourth street and Fourth avenue well was used by 21 of the cases, one doubtful,—the latter probably a contact case,— but in only one instance was it the sole source of supply. This well is located in the foreign district of the city and was used 16 times certainly, one doubtfully, in conjunction with the city water. It is very doubtful if the question were thoroughly understood in many instances, and one may be permitted to doubt the veracity of some of the informants. The analysis of this water showed it to be of fairly good sanitary quality although evidently it had been subject to past pollution, judging from the high chlorine content.

The Sixth avenue and Nineteenth street well was used by eight of the cases, four times admittedly in conjunction with the city water. As this water was very largely used by the residents of this district, the occurrence of but four cases among them who had not admittedly drunk from the infected river water would indicate that it was not a source of infection.

The Twenty-second street and Broadway well was used by 16 cases, seven of whom admitted drinking the city water. Five of them stated that this was their sole source of supply. This is a larger number relative to the probable number of persons using the well than is found in the case of most of the other sources of supply. However, since it was stated in five instances to be the only source of supply and three of those making this

	Street	Fourth avenue and 7th street	Second avenue and 6th street	Broadway and 7th street	Seventh avenue and 7th–8th streets	Broadway and 9th street	McKeever's	Huffman's	Other private wells
		18	19	20	21	22	23	24	25
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17	1								
18		2							
19		—	—						
20		—	2	—					
21		—	—	—	—				
22		—	—	—	—	1			
23		—	—	—	—	—	2		
24		—	—	—	—	—	—	—	
25	2	—	—	—	1	—	—	—	4
N	3	2	2	2	1	2	4	1	8

uency of each combination. As a result many sources are

co

APPENDIX B

WATERS USED

	City water	Second avenue and 13th street	Third avenue and 13th street	Fourth avenue and 24th street	Broadway and 22d street	Third avenue and 14th street	Bottled water	Sixth avenue and 19th street	Third avenue and 23d street	Broadway and 13th street	Fifth avenue and 13th street	Eighth avenue and 24th–25th streets	Third avenue and 2d street	Fifth avenue and 14th street	Second avenue and 3d–4th streets	Seventh avenue and 15th–16th streets	Broadway and 1st street	Fourth avenue and 7th street	Second avenue and 6th street	Broadway and 7th street	Seventh avenue and 7th–8th streets	Broadway and 9th street	McKeever's	Huffman's	Other private wells
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1 City water	7																								
2 Second avenue and 13th street	5–1	21																							
3 Third avenue and 13th street	2–1	28–1	1																						
4 24th street and Fourth avenue	16–1	—	—	1																					
5 22d street and Broadway	7	—	—	4	5																				
6 Third avenue and 14th street	2	19	12–1	—	—	3																			
7 Bottled water	7–1	10–3	9–1	3–1	1	7–1	8																		
8 Sixth avenue and 19th street	4	—	—	2	—	—	2	2																	
9 Third avenue and 23d street	1	—	—	2	—	—	0–1	—	—																
10 13th street and Broadway	—	5–1	—	—	—	—	2–1	—	—	—															
11 Fifth avenue and 13th street	2	2	1	—	—	2	2	1	—	—	1														
12 8th avenue and 24th–25th streets	—	—	—	1	1	—	—	—	—	—	—	2													
13 Third avenue and Second street	2	—	—	—	—	2	—	—	—	—	—	—	—												
14 Fifth avenue and 14th street	—	—	—	—	—	1	—	—	—	—	—	—	—	1											
15 Second avenue and 3d–4th streets	1	—	—	—	—	—	1	—	—	—	—	—	—	—	1										
16 Seventh avenue and 15th–16th sts	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—									
17 First avenue and Broadway	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1								
18 Fourth avenue and 7th street	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2							
19 Second avenue and 6th street	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—							
20 Broadway and 7th street	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—					
21 Seventh avenue 7th–8th streets	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
22 Broadway and 9th street	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1			
23 McKeever's	—	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	2		
24 Huffman's	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
25 Other private wells	3	1	1	2	3	2	1	—	—	—	—	1	—	—	—	—	2	—	—	—	1	—	—	—	4
Number of cases using each	44–1	69–4	31–1	21–1	16	27–1	36	8–1	2–1	6	7	2	2	2	2	1	3	2	2	2	1	2	4	1	8

NOTE.— The last line shows the number of cases using any given water supply. The figures above show the combinations in which each was used and the frequency of each combination. As a result many sources are counted more than once in the upper (numbered) lines.

statement were children, the credibility of this assertion is very questionable. In two instances there was strong probability of contact being the source of infection. It is not impossible, of course, that this well, as well as others in the city, would receive from time to time a sufficient number of typhoid organisms to produce an occasional case, but that this well was responsible for all the typhoid that occurred amongst its users is hardly to be believed.

The remaining wells, as will be seen from the table, were used so infrequently as to necessitate no comment.

The cases not to be accounted for by the Second avenue and Thirteenth street well are attributed to the city water supply, despite the fact that only 44 of the remaining 100 cases admitted drinking this water. With few exceptions, the water was used in cooking, washing utensils, and in many instances for toilet purposes, including brushing the teeth, and there is much doubt as to the accuracy of the statement in many instances that the water was not actually used for drinking. Ordinarily one might doubt the possibility of an explosive outbreak through such limited use of the water. However, it is conceivable that utensils used as milk containers in the home rinsed with a highly infected water would serve as a source of infection of the milk and this after a period of incubation would contain large numbers of organisms and become a medium infective even in small quantities.

The number of cases that were discovered as having their onset during the month of August among persons not using the water from the Second avenue and Thirteenth street well is significant, taken in conjunction with the fact that the city began pumping water from the Hudson on July 24. Among all the cases discovered in the investigation, but one of them gave an onset before August 6, and the Health Department records showed but five cases other than these during the months of June and July. As milk and other sources could be satisfactorily ruled out, this sudden general increase in the number of cases throughout the city, impels one to the belief that the water supply was the source of infection. The use of city water was unquestionably much greater than that indicated by the replies given the investi-

gators. The reasons for considering the city water as a contemporary source of infection may be summarized in the following:

1 The increase in the number of cases beginning twelve days after the installation of the pump on Broadway between Fifteenth and Sixteenth streets.

2 The highly polluted source from which this water was derived and the insufficient chlorination it received.

3 The fact that sewage was constantly becoming more and more highly infected by cases occurring in the Second avenue and Thirteenth street district.

4 The varied number of other sources from which the cases obtained their drinking water.

5 In the investigation conducted by Doctor Meader in 1916, the use of the city water for drinking purposes was denied in a large percentage of instances and at that time the cases occurred in that section of the city nearest the pumping station. This year after the pumping station was moved further north, the cases occurred further north.

6 The character of the population — largely foreigners and careless in their hygienic habits — leads one to doubt the statements of non-use in many instances.

7 The fact that the water was so highly polluted and, as time went on, undoubtedly, was so highly infected with typhoid that it was not even necessary to drink it in order to contract the disease. The use of a highly infected water for washing cooking utensils can produce typhoid fever.

In viewing this outbreak as a whole, it is quite apparent that much suffering and a number of deaths could have been prevented had the beginnings of this outbreak been noted and prompt measures taken to suppress the possible sources of infection. Of the 35 cases occurring in August, 14 were entirely unreported and 15 were reported from three to five weeks after the date of onset. It is recognized that the physicians are not entirely responsible for these late reports, as in some cases a physician was not consulted until two weeks or more after the date of earliest symptoms. However, in a number of these cases and in those entirely unreported this was solely the result of negligence

on the part of the physicians to perform their duty. The fact that some cases were diagnosed as other than typhoid fever hardly seems a fair excuse, inasmuch as no adequate attempt was made to diagnose the cases by the laboratory methods at their disposal. Twenty-seven per cent of the cases investigated were unreported by the physician and had to be discovered by other methods.

It was also found that in but very few instances would the other members of the family be immunized against typhoid fever, owing to a lack of appreciation of the benefits of this measure by the public and the failure of the physicians to urge it.

The records show that there were twenty-one houses in which two cases each occurred and three houses in which three cases occurred. In one instance there were five cases in one house. A study of the dates of onset shows that there were nineteen probable and six positive secondary cases. In most instances, of course, the secondary cases were exposed to the same sources of infection as the primary cases, but in the above are included as probable secondary cases only those giving dates of onset ten days or more after the primary cases.

Universal vaccination of exposures would undoubtedly have decreased the number of secondary cases which is excessively high. It probably would have been higher except for the fact that a considerable number of cases were hospitalized and but for the services of the Metropolitan nurse who visited the homes of many of the poorer cases and gave instructions in the proper precautions to be observed.

In the course of the investigation we learned of eight cases occurring among the boarders at a popular boarding house. Two of these cases were among residents of Troy who work in Watervliet and had their luncheons at this boarding house. Three had their illness after leaving Watervliet for other places, one in Kingston, one in Rutland, Vermont, and one in Conneaut, Ohio.

In the three cases occurring in Watervliet, two used water from the Second avenue and Thirteenth street well and the third drank city water. One of these cases using the Second avenue and Thirteenth street well, a Mrs. B., was employed as a cook in this boarding house, beginning the latter part of July or

early in August. No cases had occurred among the patrons of this boarding house prior to this. According to the landlady, this woman was sick when she began her employment, complaining of headache, backache and chills but continued to work despite her indisposition.

This boarding house serves from forty to fifty and as high as eighty boarders at meals, some of them steady boarders but most of them transients. The only water served was bottled water and this likewise was used in cooking.

From the dates of onset of cases not known to have used city or Second avenue and Thirteenth street water, it is probable that Mrs. B. was a carrier discharging typhoid organisms for a week or two at least prior to taking to her bed and that she was the primary source of infection for five of the cases and probably an auxiliary source for the remaining two. No cases came down from this boarding house after October 9, three weeks subsequent to Mrs. B.'s departure.

In conclusion, it may be stated that the fundamental source of Watervliet's typhoid is the present city water supply, which is not only from a highly polluted source but contains at times so much suspended matter that people will not use it for drinking. Their only recourse is to purchase bottled water or to resort to wells of questionable sanitary quality. The latter is the usual procedure among people with less than moderate incomes. Enjoinders to boil the water fail to reach the class of people most likely to use the wells for drinking and for other purposes and fail here as everywhere else to prevent a high endemic rate. The first requisite, therefore, to reduce the typhoid morbidity of this city is the displacement of the present supply with the filtered and chlorinated water from Normanskill and until this is done the efforts of the Health Department can have but slight effect upon the typhoid rate unless such efforts are continuously and intensively applied.

Subsequent to the introduction of a safe supply, all of the wells in the city should be closed and the residual typhoid will then remain the problem of the local board of health. As Watervliet has had typhoid during practically its whole existence, it is highly

probable that the number of carriers is very great, probably numbering as many as fifty in the entire community. We may expect that their rate for some years will remain higher than the average state rate unless vigorous measures are taken to see that cases are reported promptly and thoroughly investigated, and that minor sources of infection such as contact, flies and milk are properly guarded against.

The privies at present existing in the city should be made fly proof or abolished and the houses connected with the sewer system.

Another method of infection is by swimming in the Hudson river, since the river receives the untreated sewage of Watervliet, Troy and other more distant localities.

An effort should also be made to increase the percentage of pasteurized milk sold in the city and steps taken to guard against its production, sale or delivery by typhoid carriers.

This work means a considerable attention to detail and the health officer should be provided with assistance to carry it out.

During the year there occurred several interesting but fortunately smaller typhoid outbreaks, accounts of some of which follow.

In July, attention was called to the sudden appearance of several cases of typical typhoid fever in and near Millbrook, N. Y. The situation was complicated by the fact that the local health officer was one of the victims, while the other active practising physician in the locality was subject to call as an officer in the M. R. C., U. S. Army. Dr. Halsey J. Ball Jr., sanitary supervisor, was assigned to investigate the outbreak and assume charge of its control, and incidentally was given carte blanche to render medical service in emergencies, when circumstances would permit. Dr. Ball's report follows:

Typhoid Fever Outbreak, Millbrook, Dutchess County, July, 1917

Nineteen primary cases with one death and three secondary cases from a single can of milk.

Between the 15th and 27th of July, there occurred in the

village of Millbrook and the town of Washington, Dutchess county, 19 cases of typhoid fever. An investigation of the outbreak showed that all of the cases occurred among persons taking milk from one of the two milkmen serving the community, there being no cases on the other milkman's route.

It was found that the owner of the milk route under suspicion, was distributing about four hundred quarts of milk and cream daily and that all of the milk was being bottled.

The milk was obtained from five farms and delivered at the bottling plant daily, where it was bottled under good conditions as soon as delivered, and cooled immediately.

The fact that only one can contained the infective organism, the bacillus typhosus, and that the infection occurred on the 6th, 7th or 8th of July, is shown by the following facts: Three of the cases occurred in two families that procured milk from the suspected milk route only on the dates given, and all of the primary cases had an onset between the 15th and 27th of July, which would be between the minimum and maximum incubation period after infection, either on the 6th, 7th or 8th of July. As the milkman was distributing about 400 quarts of milk daily, it is reasonable to assume that there would have been a larger number of primary cases had any considerable amount of the milk contained the infective material, and that only one can was probably infected, is a reasonable assumption based upon the number of cases. A reasonable explanation of this assumption is based on the fact that the farmer who delivered the milk from the farm on which it was shown there were two carriers of the typhoid bacilli, was usually the first producer to arrive at the bottling station, but occasionally the last to arrive; that he was delivering between three and four cans of milk daily; that the bottling machine had a capacity of only three cans; that the milk from three cans was bottled, and that the milk from the fourth can was frequently bottled before another producer arrived at the bottling station, or was the last can bottled, thus making it possible that if this fourth can alone contained the typhoid bacilli, that the forty quarts or less of the milk contained in the infected can might have been delivered to the households in which the cases occurred.

In order to determine the source of the infection, specimens of blood and feces were procured from the people on the farms supplying the milk route under investigation, samples of water were also procured from the wells and springs on the several farms. It was found that a woman, 72 years of age, who had typhoid fever when a girl 12 years of age, and her daughter, 37 years of age, who apparently had never had typhoid fever were discharging the typhoid baccilli. The water from the well on the same farm also showed an excess of chlorine for the locality and was polluted with intestinal organisms.

There were three ways in which the typhoid bacilli might have reached the milk: First, directly by the woman or her daughter taking milk from the can; second, by flies going from the privy to the milk house, which were fifty feet apart and unscreened; third, by the water from the well which was used in the cooling vat in which the cans werep laced overnight.

The outbreak was suppressed by the pasteurization of all of the milk sold in the village and vicinity, the milk from the farm implicated being sold with the other milk until the probable source of the infection was discovered. Another fact tending to prove that the conditions on the farm under suspicion were responsible for the outbreak, is shown by the fact that although none of the milk sold from the other farms had been pasteurized for the five months after the probable source of the infection was discovered and the sale of milk from that farm stopped, there have been no more cases of typhoid fever (with possibly one exception) in the village of Millbrook and town of Washington.

The question naturally arises why there should have been this single outbreak on the milk route involved. The explanation seems to be that previous to April 1, 1917, the milk from the farm having the carriers was sold to a condensery and cheese factory where it was heated before being used.

PRIMARY CASES OF TYPHOID FEVER AT MILLBROOK

NAMES	Age	Sex	Date of onset	Result	Nationality
A. A.	40	Male	July 15	Recovery	American
N. A.	18	Male	July 15	Recovery	American
J. D.	50	Male	July 16	Recovery	American
P. M.	51	Male	July 16	Recovery	American
Mrs. E.	38	Female	July 16	Recovery	American
J. P.	14	Female	July 18	Recovery	Italian
M. J.	22	Female	July 18	Recovery	American
Mrs. P.	32	Female	July 18	Recovery	American
D. W.	10	Female	July 19	Recovery	Negro
F. D.	16	Male	July 19	Recovery	American
M. D.	7	Female	July 19	Recovery	American
M. M.	12	Female	July 20	Recovery	American
M. H.	24	Male	July 20	Recovery	American
P. D.	39	Male	July 22	Death	American
G. B.	22	Female	July 22	Recovery	American
A. W.	31	Male	July 27	Recovery	American
D. H. McK.	56	Male	July 27	Recovery	American
S. J.	9	Male	July *	Recovery	American
R. S.	23	Female	July 22	Recovery	American

* It was impossible to determine the date of onset in this case for the reason that the child had whooping cough, and the father who is a physician did not come to the conclusion that the child had typhoid fever until late in August, but undoubtedly the date of onset was between the 15th and 27th of July.

SECONDARY CASES

NAMES	Age	Sex	Date of onset	Result
H. L.	24	Female	August 5	Recovery.
A. D.	53	Female	August 11	Recovery.
S. L.	49	Female	August 17	Recovery.

It is interesting to note that while the primary cases are evenly distributed between males and females, there being ten and nine, respectively, the secondary cases are all female, and resulted from the nursing care given primary cases.

The lesson taught by this outbreak seems very clear, namely, that there is always a possibility of infection from raw milk.

Another small outbreak traced to infection through milk occurred during October at and near Delmar, Albany county. Delmar is one of several small unincorporated villages situated a few miles from the city of Albany.

When three cases, all school children, were reported, the writer was more than ordinarily interested, inasmuch as he resides in Delmar and has a child in school. Dr. William B. May was assigned to investigate.

Fourteen cases were ultimately discovered. Of these the first, which was unreported and apparently undiagnosed by the attending physician, occurred on a dairy farm supplying milk to one of the two licensed dealers selling Grade C raw milk. This case, with onset in the first week of October, was followed in from seven to ten days by two others upon the same dairy farm, these being unreported and apparently not diagnosed.

The other eleven cases had onsets between October 10 and 20. There were but two factors common to all; water from the public supply and milk from the dealer mentioned above.

While the water supply is known to be open to accidental pollution, water as a source of infection could be practically eliminated from the fact that four unincorporated villages receive water from the same supply, and that in only one — Delmar — had cases occurred.

Certain of the patients had received milk directly from the dealer mentioned. He also furnished milk to the local drug store and the other patients, including a member of the family of the druggist, had received it indirectly from this source in malted milk, "chocolate milk," etc.

On October first the milk dealer discontinued receiving milk from the dairy farm on which the early cases were located, this milk being sent into Albany thereafter until the investigation brought to light the foregoing facts. This no doubt accounts for the abrupt termination of the outbreak.

In July, Dr. B. R. Wakeman, sanitary supervisor, submitted the following interesting report of investigation of a series of 15 cases traced to a carrier, whose previous attack of typhoid had not been reported.

Report of Fifteen Cases of Typhoid Fever Contracted from a Mild Unreported Case Showing Positive Feces Two Months After Onset.

Township of Wellsville, Allegany Co.

The following cases were investigated:

B FAMILY.	1917
Mrs. B, 28 years	Onset May 24
D. B, 7 years	Onset May 28
S. B, 3 years	Onset May 28

S FAMILY

D. S, 14 years.....Onset May 26
O. S, 38 years.....Onset May 27
Mrs. S, 40 years.....Onset May 27
(These three patients taken to hospital June 1 and died June 10–11.)
V. B, 30 years (boarder).....Onset May 27
F. W, 22 years (boarder).....Onset May 28
(Both taken to hospital June 1.)
F. R, 14 years.....Onset June 13
W. R, 11 years.....Onset June 13
(These two children live on —— avenue, village of W. Are related to the O. S's, visited there before and after the S's were taken sick.)
Chas. S, 64 years.....Onset June 13
Mrs. S, 38 years.....Onset June 13
(Of H street, W, relatives of the O. S's, visited them and helped care for them until they were taken to hospital.)
J. S, 18 years.....Onset June 12
(Son of C. S, lives one-quarter mile north of O. S; called at the O. S's several times the last of May and the first of June; did not take a meal at the S's but did drink from the O. S. well several times.)

W FAMILY.

B. W, 30 years, married one child, L.....Onset (?) May 1
(He was indisposed about May 1 and did not work in the furniture factory for two weeks. Was not confined to the bed. His physician did not report that he had typhoid.)
L. W, 7 years.....Onset June 3
(Went to B May 30 and was taken sick with typhoid three days later.)
Mrs. O, 28 years.....Onset June 1
(Boards at C. S's, one-quarter mile up the creek from O. S's. Did washing and housework for B. W.)

On the 26th day of June my attention was called to an outbreak of typhoid in the township of Wellsville and in the village of Wellsville, Allegany county. In company with the health officer of the township we visited the place where we believed the outbreak had its origin.

The O., S., W., and B. families live up a small creek about a half mile north of the Wellsville village limits. These three houses are located on a shelving portion of a shale bank with the creek running down in front of the houses while at the back of each house is a steep hillside, the face of which is not more than

Figure 1

Well at Wellsville Which Produced the Typhoid Outbreak

Figure 2

Typhoid Pollution From the Hillside Privies Percolated into the Well

fifteen feet from the rear of the houses. Each house has a privy perched on the side hill a few feet from each house. There are no vaults to these privies and the excrement is easily washed from the bank during a heavy rain.

These three families obtain their water from a dug well in front of the S. house and near the bank of the creek as may be seen in figure No. 1. Figure No. 2 shows these three houses with outbuildings and hillside back of the houses. The house on the left is the O. S. place, the middle one, the home of B. W. and the one at the right is the B. home.

The conditions about these houses are very insanitary. Surface washings from the back yard and privy, especially from the W. property, owing to the lay of the land, can easily reach the S. well. Samples of water from the S. well examined at the laboratories of the State Department of Health, showed gross pollution with large numbers of intestinal bacteria present.

The nearest neighbor to these families lives across the creek and highway about two hundred feet south of the bridge shown in figure No. 1. The members of this family obtain their water from a spring on the east slope and did not come in contact with their neighbors across the way. There was no illness in this family. Other neighbors further down the creek obtain their water from other springs and wells. No illness in these families.

Each of these sixteen persons infected, with the exception of B. W., was very sick. The three members of the O. S. family all died within ten or twelve days after the onset. This would lead one to believe that the infection was obtained fresh and in large quantities. As far as I could learn, none of these persons had come in contact with any person sick with typhoid or with persons who had had typhoid.

As B. W. was the first person in this group to show symptoms of typhoid, it is believed that he was the direct source of the infection. During his brief illness he used the privy daily and no attempt was made to disinfect his discharges, owing to the fact that he was not aware that he had typhoid fever and his physician had not given him any instructions as to the proper disposal of his excreta. During his indisposition he took all of his meals at home and did not come in contact with his neighbors.

An examination of B. W's. feces showed, on July 1, the presence of typhoid bacilli. This would strongly indicate that he had "walking typhoid" the first two weeks in May.

As all the persons in this group drank from the S. well, it is believed that the well was the medium for the transfer of the infection which had its origin in the person of B. W., whose discharges were washed into the well during the heavy rains of the early part of May. The well was abandoned during the first week of June. The last cases had their onset June 13.

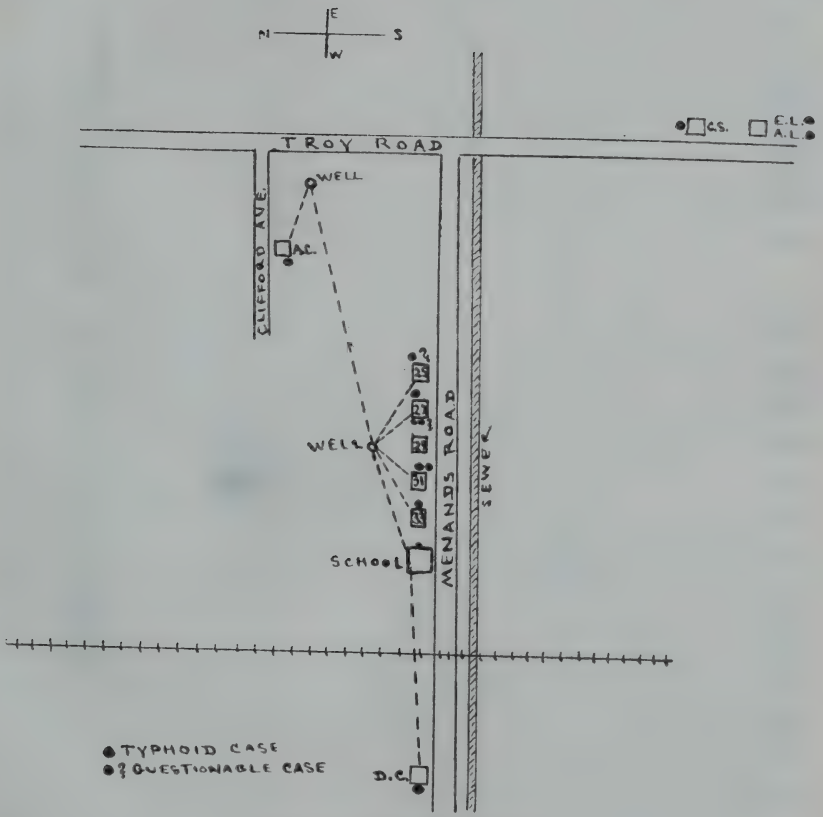
Careful inquiry of B. W., his employers and his associates in the Wellsville furniture factory does not reveal where he obtained his infection. However, Wellsville has had many cases of typhoid in recent years, many having been traced to carriers through the milk supply. An unrecognized carrier among his Wellsville associates might explain his infection.

An outbreak of this sort is a serious matter. Had B. W's. illness been recognized and proper steps taken to disinfect his discharges, possibly three lives could have been saved as well as twelve other cases of serious illness. A rural survey of these premises would have revealed a most insanitary condition: open privies on a side hill with a dug well so placed that it acted as a catch basin for the washings from the privy and back yard. Very little, however, can be done to remedy these conditions in country districts until the public is educated, and boards of health are thoroughly aroused to the importance of preventive measures.

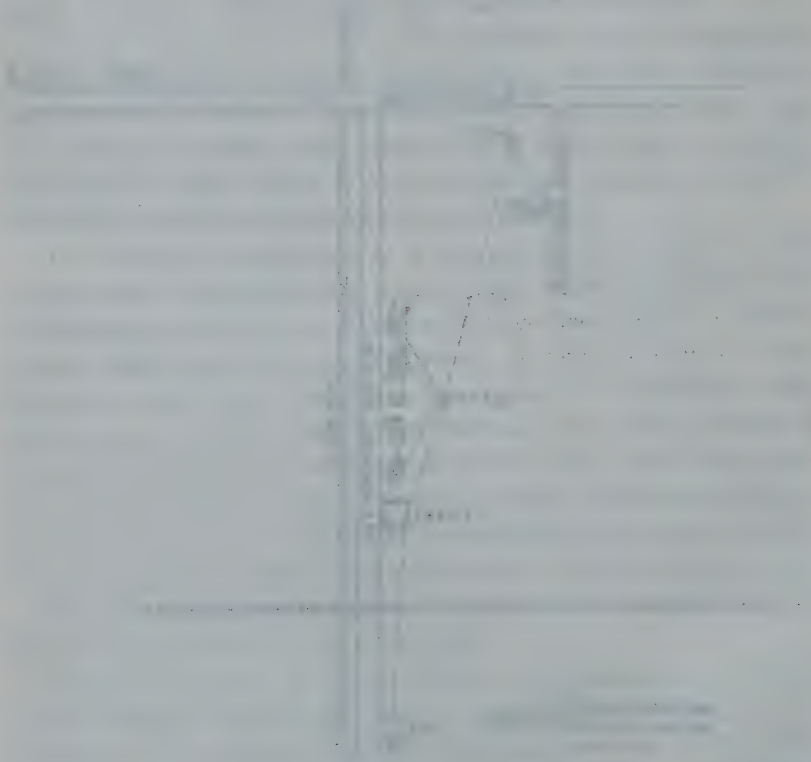
The chart accompanying this report shows in a graphic way the mode of infection in this outbreak.

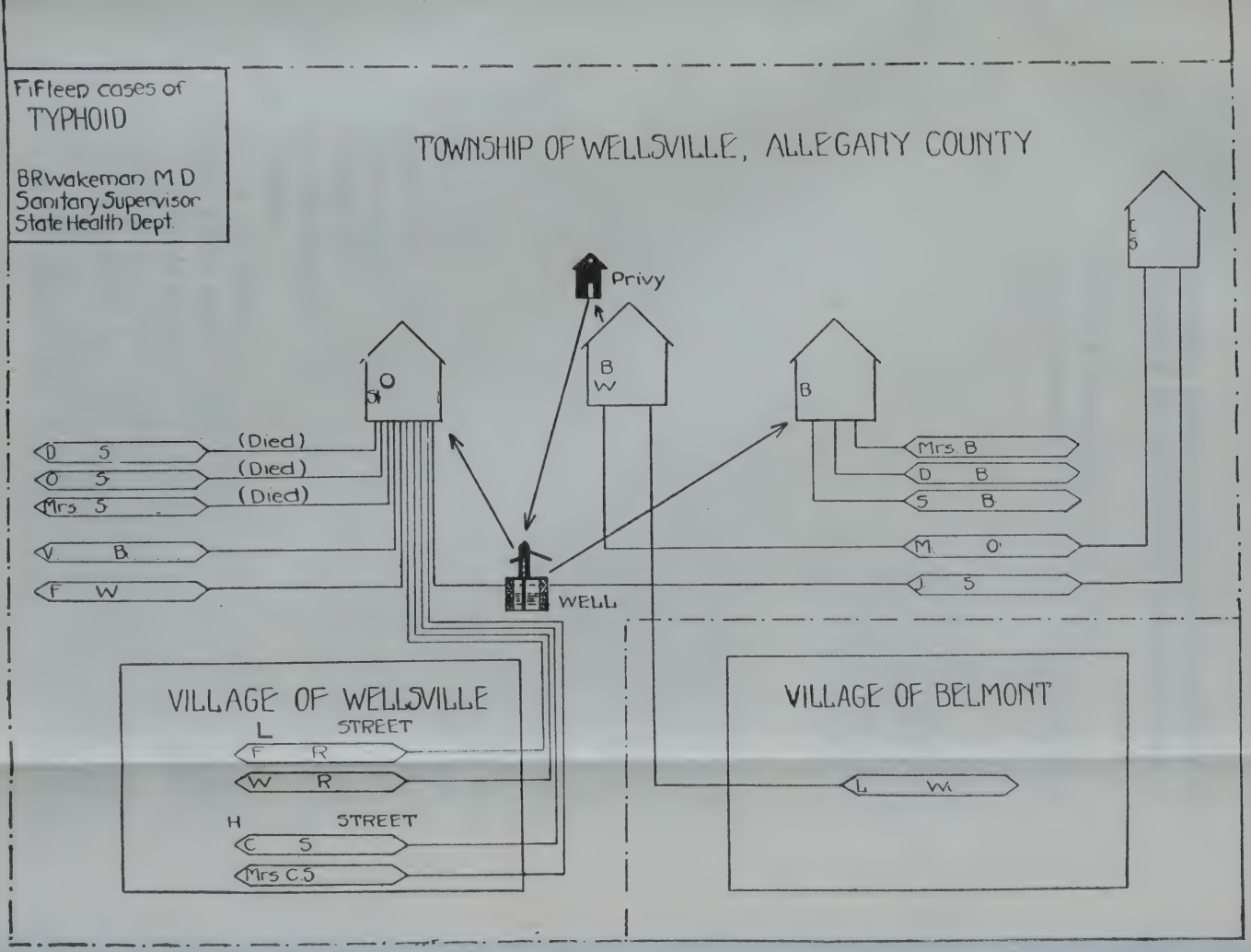
Upon the reports of health officers and physicians attending typhoid cases "well water" frequently appears as the source of infection. In comparatively few instances, however, is the allegation supported by evidence found upon investigation. In the outbreak described above the evidence is especially conclusive since the source of infection of the well was definitely determined.

In this connection, the writer investigated a small outbreak which occurred during the spring and early summer at Menands, an unincorporated village a few miles from Albany on the Troy road. Evidence pointed definitely to infection of several persons through well water, although we were unable to go beyond this



TYPHOID FEVER, MENANDS, 1917.




Fifteen cases of
TYPHOID
BR Wakeman M D
Sanitary Supervisor
State Health Dept.
TOWNSHIP OF WELLSVILLE, ALLEGANY COUNTY
Privy
B
W
B
(Died)
(Died)
(Died)
Mrs. B
D B
S B
M O
J S
WELL
VILLAGE OF WELLSVILLE
L STREET
F R
W R
H STREET
C S
Mrs C.S
VILLAGE OF BELMONT
L W.

and definitely determine from what source the water received its infection.

The following tabulation presents certain details regarding the nine cases which occurred, the third having been unreported:

TYPHOID FEVER CASES AT MENANDS

NAME	Age	Address	Onset
1. E. L.	12	Troy road.....	April 1
2. A. L.	6	Troy road.....	April 12
3. C. S.	10	Troy road.....	April 14
4. M. K.	25	Menands road..	June 4
5. L. H.	23	Menands road..	June 12
6. C. A.	12	Menands road..	June 10
7. A. C.	Adult	Clifford ave.....	June 12
8. H. H.	22	Menands road..	June 14
9. D. C.	11	Menands road..	June 17

The diagram shows the location of cases.

Menands road is situated on a sharp slope, rising from Troy road toward and beyond the railroad. Other houses than those involved, several of which were located on the south side of the street, are not shown on the accompanying diagram. The hillside is made up largely of a loose shale rock, which comes to the surface at many points. Along the south side of the road is a sewer laid several years ago. On the grade, west of the railroad and north of Menands road is a cemetery to which a large number of bodies had been transferred during the spring. During the spring and up to within a week of onset of the later cases, the ground had been saturated with water, and it was said to have been necessary to pump out graves in the cemetery before transferring bodies to them. The toilet at the D. & H. R. R. station near Menands road is connected with the sewer shown in the diagram.

Most of the houses in this section receive water from the Watervliet public supply. Inasmuch as this supply was generally considered unsafe and unfit for use, most of the residents of Menands resorted to wells for their supply of drinking water.

The first case, E. L., onset April 1, apparently received his infection from an independent source. The second and third cases who were contact cases with E. L., M. K., L. H., C. A. and

H. H. with onsets June 4, 12, 10, 14, respectively lived in the row of houses from 25 to 33 Menands road, and obtained their drinking water from a well at No. 29. The members of the household at No. 29 where there were no cases were elderly adults.

The well at No. 29 was a driven well about 50 feet deep. About June 20 it became impossible to pump water and investigation revealed the fact that the casing was broken. After that time, knowing that the well water was regarded with suspicion, the owner had disconnected the handle, so that the neighbors could not use the water. For some time prior to that time, persons using the water had apparently been boiling it.

D. C., onset June 17, was a school boy living at a considerable distance from the cases referred to above. About two weeks before onset he had been working in a school garden and had several times drunk freely of the water from the well at No. 29.

A. C., Clifford Ave., onset June 12, was a salesman whose travels took him regularly to Watervliet and Troy. In Watervliet typhoid was usually prevailing to some extent. His water supply when at home came from a dug well indicated on the diagram. This well was located at the foot of a steep grade, a short distance below the well at No. 29.

About two weeks before his onset, water had been standing in an excavation near his home. The water in the well usually became turbid after every heavy rain. It was stated that a sample had been examined at a private laboratory; his only information was that it was of a poor sanitary quality. It is not unreasonable to assume that this well may have been subject to pollution at the same time as the well at 29 Menands road and from the same source.

In addition to the cases described there were three cases in the houses indicated on Menands road, which were suspicious but in which the attending physician had made other diagnoses than typhoid. All had used well water from No. 29 regularly.

INSTITUTIONAL OUTBREAKS

Typhoid cases have occurred from time to time in a number of the state hospitals for the insane. Early in the year the matter was taken up with the State Hospital Commission from which

directions went to hospital superintendents that all future admissions be vaccinated against typhoid. Since that time vaccine has been furnished to the hospitals by the laboratory of this department.

During August, 16 cases of typhoid occurred at Trudeau Sanatorium, Saranac Lake, the onsets of 15 occuring between August 15 and 31. A state epidemiologist and Dr. William L. Munson, sanitary supervisor of the district in which the institution is located, were assigned to investigate and assist in control of the outbreak. After a detailed investigation it was determined that infection had probably occurred through handling of food supplied to one dining room. Samples of excreta from 79 persons regarded as possible carriers were examined with negative results. One of these persons, employed as a waitress, and having general charge of the placing of glasses, silverware and linen, gave a partial Widal reaction. A single fecal sample showed no typhoid bacilli. Unfortunately, this young woman and one or two other employes left the institution at about this time and were lost sight of. There were, however, no subsequent cases.

A few particularly interesting paragraphs extracted from the reports filed by the investigators follow:

"Because of the difficulty in differentiating typhoid from an exacerbation of tuberculosis in patients with pulmonary tuberculosis, blood cultures were made from the first few persons taken ill. The culture showed very actively motile Gram negative bacilli, which clumped upon the addition of immune typhoid serum. After the definite character of the infection was known, Widals were used for diagnosis.

"The routine work of the institution, so far as possible, was dropped and the entire attention of the staff was focused on getting the patients with typhoid isolated. The infirmary was converted into a typhoid hospital and here all the patients who ran an unusual or unexplainable temperature were taken as suspicious cases of typhoid. These suspicious cases were isolated from the rest of the known cases of typhoid. The usual methods of precaution, disinfection of the stools and urine, washing of attendants' hands, sterilization of bed linen, dishes, etc., and the rigid exclusion of flies were carried out with the suspicious cases

as well as with the known cases. It is noteworthy here to state that but two patients were isolated who did not develop frank typhoid fever. As all patients running a temperature not definitely known to be from tuberculosis were put upon precautions and watched, it is probable that no cases of typhoid were missed.

"The question as to whether or not patients with active tuberculosis should be injected with typhoid vaccine was not known and so far as we were able to ascertain had never been done in any institution for the care of tuberculosis. Due to the uncertainty of the source of the infection Dr. Lawrason Brown advised that all patients be vaccinated. Form August 28 to 31, 172 of the employes and patients were vaccinated. All patients were immunized save those who were very ill with tuberculosis. A very careful record was kept of the results of the vaccination in all the patients as regards reaction, effect on existing tuberculosis, temperature, etc., and will be the subject of a report by Dr. Fred H. Heise, resident physician of the Trudeau Sanatorium. The reactions were about the same as seen following the vaccination of the nontuberculous. There were noted no unfavorable immediate results.

"The character of the infection was selective. Except in two instances the persons attacked were patients with tuberculosis who were up and about and eating their meals in the main dining room. Patients who were confined to the bed and were being served exclusively by trays, with one possible exception, were entirely untouched by the infection. Patients at the infirmary, served with food prepared in the infirmary, were also free from typhoid."

Early in September Dr. C. R. Hervey, sanitary supervisor, investigated a series of eleven cases which were reported during the latter part of August from the Wayne county home.

It was found that the first case had been ill upon admission to the home in July. During his illness and until he was removed to a Rochester hospital, his discharges were thrown untreated into a flush closet, the sewers connected with which discharged into a canal situated some fifty yards from the main building.

A sluggish current in the canal tends toward the east. About 35 feet east of the sewer outlet was an intake through which water to be used for laundry purposes, flushing closets, washing dishes, faces, hands, etc., was pumped to the institution. The supply of drinking water came from a spring, and was pumped by the same pump into separate pipes. For about three feet on the intake side of the pump a common pipe was used for both supplies. It was customary before pumping spring water to the reservoir used for that purpose to flush the intake pipe with spring water. While pumping spring water, the canal intake was closed by a valve located approximately three feet from the junction of the spring and canal intakes. This left a dead end in the canal intake capable of holding a small quantity of the polluted water. Pollution occurring in this way, at a time when the sewer was discharging infective material from the first case, was apparently responsible for the subsequent cases.

For its possible interest in connection with our efforts to encourage more systematic and effective investigation of typhoid cases and outbreaks by local health officers, there is appended an article prepared by the writer for publication in HEALTH NEWS.

THE CONTROL OF TYPHOID FEVER

The investigation of a recent typhoid fever outbreak has brought to light conditions which, while not new, are worthy of serious consideration. It was found that there were numerous cases which had never been reported; others in which reports had been delayed beyond all reason, assuming average diagnostic ability on the part of attending physicians; still others in which "snap-shot" diagnoses had been made without resort to laboratory aids which were easily available. Notwithstanding the fact that it is now a matter of common knowledge that typhoid fever has been practically eliminated from the armies of the world by antityphoid vaccination, a safe and simple procedure, only in rare instances had the members of families in which there were typhoid cases been immunized, and some families had never even heard of it.

No communicable disease can be controlled unless we can know *where* the cases are and *how* they received their infection. Practising physicians are the scouts upon whom we must depend to keep us informed as to the location of the enemy. The laws requiring immediate reporting of cases are both reasonable and specific. With due allowance for the necessary margin of delay on account of the difficulty of diagnosis in some cases, the interval between onset and report should rarely exceed ten days in the hands of physicians of average diagnostic skill, if they are willing to use and able to interpret the results of laboratory procedures, and, desire to live up to the

spirit of the law. Pending a positive diagnosis, a suspicious case should be regarded as a *probable* case, and physician and health authorities should cooperate in its control for the protection of the public. The feeling is growing that in the past we have been too lenient with those who are either indifferent to the common welfare, or incompetent.

"Malpractice" is an ugly word; yet there is serious question whether the members of the family of a typhoid patient, contracting the disease through contact with him, have not a legal grievance against the attending physician, if he has failed to advise and offer protective inoculation.

The responsibility of the health officer is equally great. In municipalities blessed with efficient and intelligent health officials, there is usually little cause for complaint regarding the attitude of the practising physicians. The health officer who cooperates receives cooperation. While inefficiency on the part of this official does not absolve the physician from his legal obligations, it is not surprising if the spirit of cooperation does not prevail where the health officer is habitually discourteous, and where, when cases are reported, nothing happens.

In practically every instance when a typhoid case is reported, the health officer, or a qualified representative, should visit the household and not only perform the routine duties incidental to the situation, but conduct a searching investigation to ascertain the source of the infection and prevent its becoming the source of other cases.

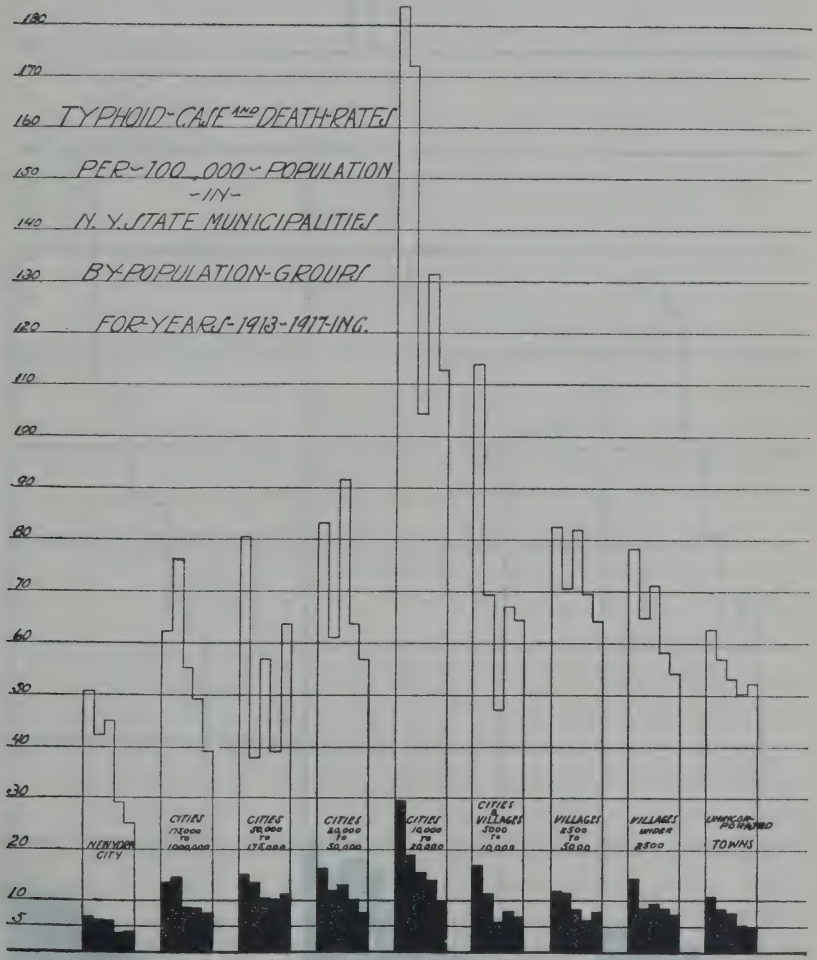
From the study of a large number of report cards received from health officers, and at times from comparison of the data thus submitted with the actual facts obtained through subsequent investigation, it is apparent that in all too many instances investigations are superficial and the data submitted unreliable. Often the source of infection cannot be definitely determined until the date of onset is known and the probable date of infection estimated therefrom. Yet it is commonly found that the date given as that of onset is actually the date when the physician was called, or when the temperature reached its greatest height, rather than that of the actual beginning of the illness a week or two before. Sources of infection are recorded as "unknown," "imported," "flies," or even "an open cesspool." "Well water" appears frequently, notwithstanding the fact that it is now generally known that wells are only sources of infection when they are receiving discharges from a typhoid case or carrier, in which event the investigation is not complete until the case or carrier has been located.

Years of education will be required before typhoid fever will be eliminated as a national scourge. This education will proceed by leaps and bounds when the thousands of men now in the service of the country, who have learned that typhoid is prevented when there is mutual cooperation, have returned to their homes. They will have little sympathy with the ignorance and inefficiency which permits a preventable scourge to go uncontrolled.

Analysis of statistics relative to typhoid fever

For the seventh successive year there was a decline in the State's typhoid death rate and contrary to previous years this was despite a small increase in the rate for New York city.

Chart 15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170
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TYPHOID-CASE AND DEATH-RATES
150
PER-100,000-POPULATION
-IN-
140
N. Y. STATE MUNICIPALITIES
130
BY-POPULATION-GROUPS
120
FOR-YEARS-1913-1917-INC.
110
100
90
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70
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50
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30
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10
5
NEW YORK CITY
CITIES 175000 TO 1000000
CITIES 50,000 TO 175,000
CITIES 25,000 TO 50,000
CITIES 10,000 TO 25,000
CITIES & VILLAGES 5000 TO 10,000
VILLAGES 2500 TO 5000
VILLAGES UNDER 2500
UNINCORPORATED TOWNS

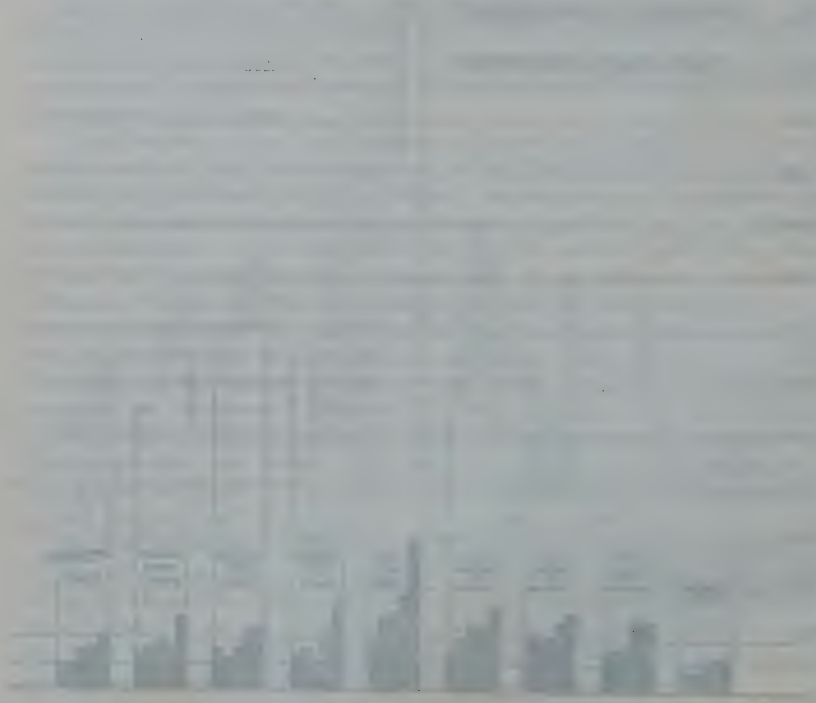
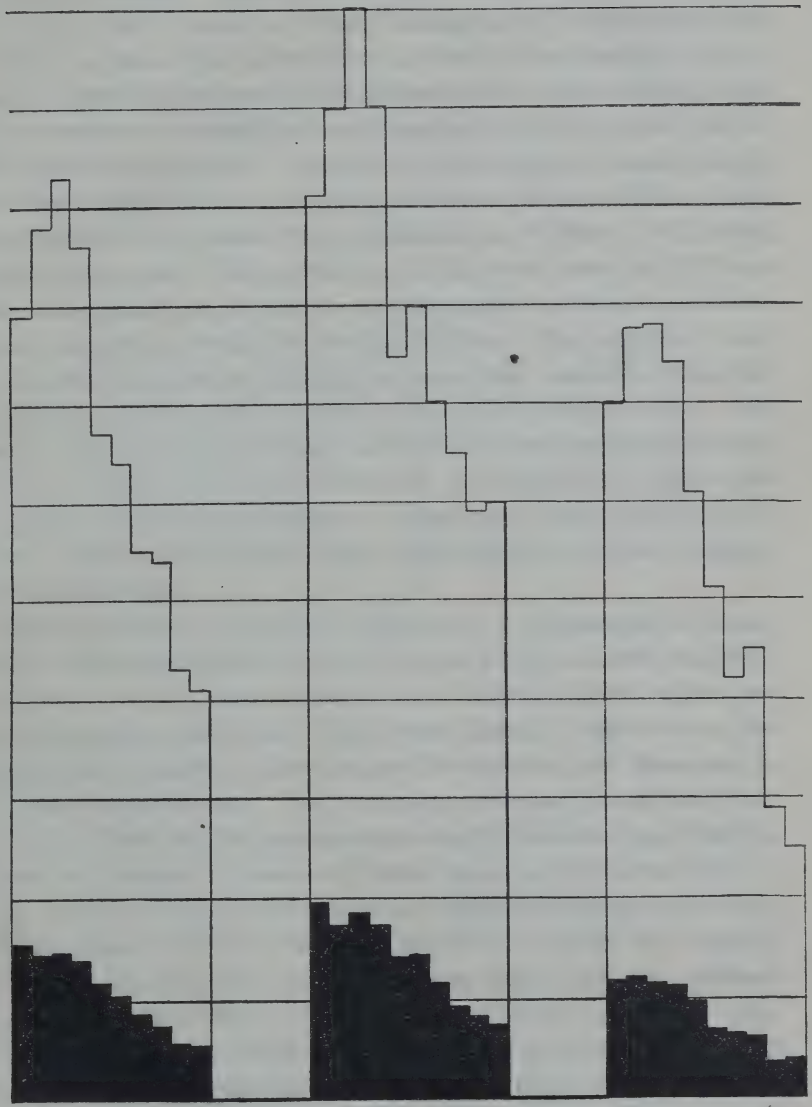


Chart 16



Entire State Rest of State New York City

Annual Case and Death Rates Per 100,000 Population for Typhoid Fever, 1908–1917, for Entire State, New York City and Rest of State

While the upstate rate has shown a continuous decline since 1913, New York City had shown such a decline since 1910 and had contributed materially to the declining typhoid death rate of the State as a whole. Since little could be deduced from the study of county death rates or of city death rates as compared with "rural" rates as the latter term is used in the monthly bulletin and the previous reports of the Department, it has seemed desirable to resort to a classification dependent upon the actual size of the population groups. Accordingly the upstate municipalities have been aggregated into eight classes as shown in the accompanying chart and table, the populations as of June, 1915, being taken as the base. The population of the same areas in 1910 was then determined and the mid-year estimates made in the usual way using the group totals for the calculation. The reported cases and deaths from the various classes were then assembled from the previous annual reports and the records of the Department. The deaths and cases from State institutions have not been included in the municipalities in which they are located but have been separately grouped although no rates have been calculated for them. The populations of these institutions were not included in the 1915 census.

As may be seen by looking at chart No. 15, although all classes show a lower death rate in 1917 than in 1913, minor fluctuations are found in all classes except the 10,000 – 20,000 class and the unincorporated towns. Case rates, based as they are on less dependable reporting, show larger fluctuations and these are to be found in all classes. Taking up the different groups seriatim, it is found that the first group, consisting of Rochester and Buffalo, shows an increase in case and death rates in 1914 over 1913, a very marked drop in 1915 and a slightly declining rate since. The preponderance of Buffalo's population masks the remarkably good showing of Rochester, whose death rate has declined from 11 per 100,000 in 1914 to 3 per 100,000 in 1917. This death rate was the lowest recorded in any city in the State of 50,000 or more population. Three of the eight recorded deaths were among patients sent in from Wayne County Home (near Lyons) for treatment and one other came from a village in Monroe county. The reduction of the past two years has been ascribed

by the health officer to the improvement of water supplies and sanitary conditions in nearby pleasure resorts largely patronized by Rochester people. Antityphoid vaccination has been extensively advertised but it is not possible to estimate the influence of this measure from the data at hand.

The persistence of Buffalo's rate at or above 10 per 100,000 is only in a slight degree explicable by the deaths of patients sent in for treatment. Only six of the 47 deaths were among such patients and it has been noted too that Buffalo has been mentioned rather prominently in the itinerary of cases investigated elsewhere in the State. The city water supply is derived from Lake Erie, without filtration, and is disinfected with liquid chlorine. The somewhat erratic monthly incidence of the cases gives rise to a suspicion that the water supply is in part to blame. Buffalo is under the disadvantage, however, of having in its vicinity the small city of Tonawanda where the water supply is notoriously polluted and whose typhoid case rate is one of the highest in the State. The monthly bulletins of the Buffalo city health department ascribe 35 cases among residents to out of town infection and give 16 as the number of cases brought into the city for treatment. Among the latter there were six deaths. Even deducting these the death rate of the city remains 8.8 per 100,000 which should hardly be accounted satisfactory for the second city of the State.

A further criticism of Buffalo's typhoid should be made of the abnormally high case fatality rate — 22 per cent — twice as high as Rochester's and nearly double that of the State outside New York City. The inference to be drawn is that cases are very incompletely reported. It would seem that by insisting upon complete reporting and by intensive investigation of all cases the probable sources could be ascertained and the proper remedial measures applied, with a material reduction in the typhoid rate as a result.

The cities of the second class (population from 50,000 to 175,000) showed as a group an increase in 1917 over 1916 and 1915, both in case and mortality rates. Albany, Troy and Yonkers contributed most to the increase in the death rate though the latter's mortality rate was well below that of upstate New

York as a whole and but little more than half that of the combined rate for cities of this class. Yonkers' case fatality rate of 37.5 per cent is indicative of lax reporting of cases and as a corollary of incomplete investigations. It would seem that with but little effort Yonkers should be able to maintain a rate very near its low record of 1916.

Yonkers, Syracuse and Schenectady all had mortality rates below that of the group as a whole but Schenectady is the only one of these three showing a case fatality rate indicative of good reporting, and it is perhaps significant that it has the lowest mortality rate of this group and has maintained its low rate for two successive years. Syracuse has a case fatality rate of ridiculous proportions (38.5 per cent) and the marked fluctuations in its rate from year to year strengthen the suspicion that its rate for the past year has been fortuitous rather than the result of control.

The highest rate for any city in the group is Troy's which is more than twice that of the group as a whole or that of any single member of it. However, two factors for which Troy is not wholly responsible enter as mitigating circumstances. First, Troy is the hospital center for Watervliet and Mechanicville and their environs, places subject to very high typhoid rates. Second, these places, more especially Watervliet, serve to infect residents of Troy who work or visit in those communities. As regards the first point an examination of the Troy death certificates shows 7 deaths to have been nonresidents of Troy leaving 14 deaths among residents and giving a death rate (18.7) which is still more than 50 per cent higher than that of the group as a whole.

The influence of the second point is more difficult to estimate. During the course of an investigation of the outbreak in Watervliet in September and October a number of Troy residents were found to have been infected in the former city but the relatively small number of such cases does not indicate that Troy's typhoid rate should be satisfactory to her citizens even if such outside sources were eliminated. In other words, there is some inherent defect which should be sought out and remedied. A localized outbreak investigated by the local health department was found to be due to an infected well extensively used in the affected neighborhood. While this accounted for a large proportion of the cases reported

in Troy for the year it failed to account for a corresponding proportion of the deaths (exclusive of deaths among imported cases). The disproportion of deaths to cases was especially marked in the first half of the year during which period 8 deaths and but 16 cases were reported, only one of the deaths being that of a nonresident.

Unquestionably a very considerable reduction in Troy's typhoid rate can be effected with comparatively small effort. The menace of the neighboring cities might be mitigated by proper publicity of their danger and the encouragement of antityphoid vaccination for those whose business requires them to visit those places. Second, it is stated that a considerable number of wells of doubtful safety exist in the city. Should the municipal supply be shown to be safe beyond reasonable doubt their elimination would be an obvious duty. It seems hardly tenable, as some contend, that a mere warning to desist from the use of an unsafe water constitutes the full duty of a health department having power to abate such a menace. If only those drinking from such a source were attacked by the disease there would be more reason for this contention, but when it is considered that each case constitutes a focus of infection throughout the febrile period and for a varying length of time afterward, it is apparent that having typhoid is not merely a matter of personal concern. Other things being equal, the more seed the bigger the crop.

Albany's typhoid rate increased somewhat over its low record for 1916 and the case rate was materially increased by the occurrence of an unusually large number of cases in November and December. Some difficulty was experienced about this time with the operation of the filter plant and during the early part of this period an unusual number of typhoid cases and convalescents existed in Troy and Watervliet. A sharp decline followed the resumption of adequate treatment of the water supply. Four of Albany's typhoid deaths were among nonresidents.

Utica experienced a sharp outbreak during February, over two-thirds of all cases reported during the year occurring in that month. The case and mortality incidence for the last half of the year indicates lax reporting, a condition which the records for the preceding four years indicate is a chronic one. Under such cir-

cumstances an outbreak can easily reach large proportions before discovery, with resulting loss from the lack of prompt application of proper remedial measures. The January-February outbreak was due to a defective valve in a cross connection between the city's main and an industrial plant's private supply — a happening which still occurs despite numerous bitter experiences.

This group of cities as a whole seems not to have made the progress which might have been expected of it. It is the only group of the series whose death rate remains above 10 per 100,000 and, despite the importation of cases for treatment, a material reduction should follow if adequate reporting were insisted upon and a moderate amount of intensive work instituted.

The group of cities of from 20,000 – 50,000 population attained a reduction of nearly 25 per cent over its death rate for the previous year and as indicated by its lowered case fatality rate, reporting of cases has shown considerable improvement. No remarkable outbreaks occurred during the year although limited outbreaks occurred in Niagara Falls and Kingston — the former confined to a locality using a private well, the latter due to a suspension of the filtration plant during repairs. Amsterdam and Newburgh came through the year without a typhoid death. The one death in Oswego was a case sent in for treatment as were four of the five deaths in Elmira and two of the three occurring in Poughkeepsie.

Newburgh until 1916 had had a high rate, though it had been enormously reduced from the excessive rate which prevailed prior to the sterilization of its water supply. Most of the residual typhoid was found in 1915 to be due to a typhoid carrier supplying milk to the city. This carrier had been supplying milk for ten years and undoubtedly had been responsible for a large proportion of the city's typhoid,— a good illustration of how a polluted water supply can mask other sources of typhoid. The populations of the cities in this class are not sufficiently large to provide stable individual rates, a slight increase in morbidity or mortality causing a much larger fluctuation in the rate. The health officers of these and smaller municipalities have peculiar need of prompt reports from physicians followed by prompt investigation if the gains already made are to be held or further

reduction effected. While this group was in 1917 more affected than any other by the deaths of imported cases yet even eliminating these the rate of the group is much higher than that of New York City or Rochester with all typhoid deaths included.

The group of cities and villages from 10,000–20,000 shows the highest case rate and, excepting the unincorporated towns, the lowest case fatality rate of any group in the series. This result is due entirely to the discovery of a large number of unreported cases in Watervliet, many of which were of a very mild type. The group has divided its mortality by three and its morbidity by two since 1913. Although it has accomplished the largest relative reduction, it has been during this time the one most in need of such reduction — one in which it could be most readily accomplished. Twelve of the cities in this class have installed liquid chlorine or hypochlorite plants since 1913 and the typhoid reduction can be almost entirely attributed to this. Two of the cities in this class, Watervliet and Batavia, have made recent improvements in their water supplies which should still further improve the record for the group.

Watervliet for many years past has maintained the unenviable position of having one of the highest typhoid mortality rates in the state, a rate, too, which in recent years has only partially measured the true condition of affairs. While but one death from typhoid occurred in Watervliet in 1917, three occurred in Troy hospitals among residents sent there for treatment; and an investigation of the records of previous years shows that this has been happening regularly since 1913. Watervliet has been cursed with a municipal supply which can be truly classed as vile, and this has led the population to resort to a number of public and private wells none of which are safe from pollution. It will depend upon how vigorously the local authorities abate these potential sources of infection as to the length of time that will elapse before another outbreak occurs. One of these wells became infected during the past summer and had a localized outbreak of some forty or fifty cases, and upon this was superimposed a yet greater number of cases due to infection of the municipal supply. The latter came from inadequate treatment (by liquid chlorine) of an auxiliary supply from the Hud-

son river. The wells, however, are not the only sources from which typhoid may be expected in the future. The numerous cases of the past have almost certainly left some carriers to be reckoned with and places a responsibility upon the local health department which in the past it was possible to shift in large measure to the water bureau.

Lockport, North Tonawanda, Plattsburg and Ithaca are cities in this class having death rates above the average for the group and rates which show little tendency toward permanent decline. The two former have experienced difficulty from time to time in the operation of their chlorinating plants and the health officer of Ithaca was of the opinion in 1915 that that city still had a water problem. As shown by reports of the Engineering Division many communities after installing purification plants fail to provide competent management for them or to insure themselves against the results of breakdowns by duplication of chlorinating apparatus. These are points upon which the Engineering Division has been laying stress for some years past. It is simply up to the affected communities to apply them.

The cities of Beacon, Cortland, Johnstown and Hornell show consistently low rates for the past four years or more, with case rates consistent with good reporting.

The 5,000 – 10,000 group constituting the smallest population group of the series has for the past two years exceeded the low rate reached in 1915. Two cities in this group are deserving of special mention. Tonawanda still supplies its citizens and those compelled to visit the place with untreated Niagara river water. Though no deaths from typhoid are shown to have occurred in this place during the past year yet an examination of the North Tonawanda and Buffalo death certificates show that in each of these cities there were two deaths of Tonawanda residents sent in for treatment. It is also blamed for much of the typhoid occurring among North Tonawanda and Buffalo residents, not to mention country cases in the vicinity.

Mechanicville suffered two localized outbreaks during the year, one in August, ascribed to an infected private well, the second due to an infected milk supply. Investigation of the latter led to the discovery of a mild unrecognized case of typhoid on one

of the farms contributing to the supply. The case on the dairy farm gave a positive Widal though the attending physician had had no suspicion of typhoid during his attendance on the case. Four deaths from typhoid occurred in the city during the year and two residents of Mechanicville died of the disease in Troy. A consideration of the case and death incidence for the past five years indicates that Mechanicville is constantly menaced by typhoid and that during the past two years it has suffered unduly from this infection. The habit of resorting in large measure to Troy hospitals makes it impossible to say without further investigation what the true case and death rates have been prior to 1917. It is apparent, however, that an amount exists and that there has been no improvement. The city water supply is not above suspicion though seemingly no typhoid has been attributed to this source.

The village of Malone quite constantly contributes to the morbidity and mortality of this group, but during the past year this has been due in greatest part of the importation of cases from Massena for treatment. Catskill village too is a constant contributor. An investigation of the cases which occurred there early in 1917 indicated the village water supply as the principal medium of transmission. A number of cases occurring in the nearby towns and villages were also attributable to this source. The village of Walden, which suffered extensively from typhoid in the winter of 1913–1914, has since been very nearly free from the disease. A reinspection of its water supply in 1915 showed that some dangerous wells from which a portion of the municipal supply is derived were still in use. Until this fault is rectified we may look for further trouble at any time.

The group of villages of from 2,500 – 5,000 population experienced an increase in its death rate for 1917 over that of the previous year although the morbidity rate decreased. The villages of Wellsville, Allegany county and Massena, St. Lawrence county, stand out prominently as foci of infection. The former had an outbreak, in May and June which was found to be due to an infected well outside the village. In all fifteen people were affected by this outbreak, five in the village, the remaining ten in the town. The medium of infection was a well subject to surface pollution

from a nearby privy, and the source of infection, a mild unrecognized typhoid case. The latter gave a positive Widal and his stools were still positive for typhoid bacilli when last examined in October. The three deaths which occurred in Wellsville village were in one family sent to the hospital from the town. The above mentioned well was on the premises occupied by this family and they doubtless received a larger dose of infection than the others.

The Massena cases were the result of the continued use of the polluted water served the people of that village. The cases reported from the town have also been attributed to this source. Two deaths were reported in the village, one of them a case reported from the town, but as previously mentioned four Massena residents died from typhoid in Malone, where they had been sent for treatment. The majority of the cases which occurred in the early part of the year were workers in the aluminum works though all the village was supplied for a period of about six weeks with unfiltered and unchlorinated St. Lawrence water. There was an apparent subsidence of the cases following the resumption of treatment but it is very doubtful if complete reporting has been practiced at any time. Three deaths of Massena residents were reported from Malone in the fall, one each in the months of September, October, and November, while no cases whatever were reported from Massena during the period August and November inclusive. One is led to believe that the matter is one of indifference to the community — that like Watervliet they expect typhoid and would suffer disappointment if they did not have it.

There are a number of communities in this and the succeeding groups that are by no means typhoid proof and whose escape from typhoid in the past is due purely to chance. There is evident, however, a decided improvement during the past five years but further gains are possible; indeed the gains already made can only be maintained by constant vigilance on the part of the local health officers.

The incorporated villages having fewer than 2,500 inhabitants were grouped separately as they constitute a considerable percentage of the total upstate population and one with peculiar typhoid liabilities. As a class they are without sewerage systems and to

a less extent without public water supplies. They are classed in most if not all statistical reports as rural and yet there is the essential difference that the inhabitants are not isolated and that they have many things in common. The possibilities for fly-borne infection here reach their optimum — many privies and short distances to travel. It has been stated that "rural typhoid" is not "truly rural"— that the bulk of it is really found in the small villages classed as rural in census reports. It has been thought well, therefore, to test this contention in so far as it is possible, recognizing that there is a considerable margin of error due to the inclusion of a large number of unincorporated villages in the rural or "town" group. It is impossible to obtain an estimate of the populations of such places or of cases and deaths occurring in them but the tendency is probably quite as well demonstrated as it would be if greater refinement were possible.

As a whole this group showed as one of the best both as to morbidity and mortality rates although not as well as the town group. The mortality rates of both of them are, however, actually higher than represented in the charted rates. While not affecting them for comparative purposes within the group they are unfair in comparison with other groups. Nine cases from this group died in communities of larger size to which they had been sent for treatment while only one died who was imported from other communities. The allocation of these deaths would raise the mortality rate by nearly ⅓ or to 9.5 per 100,000. The rates have been consistently lowered, however, during the past three years and show a marked reduction from the high rate of 1913. There was but one well-marked outbreak in this group during the past year, this being the milk-borne outbreak in Millbrook, Dutchess county. Investigation of this outbreak which amounted to 19 cases in the village and surrounding town of Washington, proved it to be due to a milk supply infected by one or both of two carriers on a dairy farm. One of these carriers had had an indefinite attack of typhoid about sixty years before (diagnosed malaria) while the other (her daughter) gave no typhoid history at all. The great bulk of the cases in this class have been scattered through the 361 villages which constitute it and these will be considered subsequently with other so called sporadic cases.

The population living in unincorporated towns and villages has for the second successive year attained the lowest death rate of any group and has just managed to maintain the low record of the preceding year. Like the preceding class some deaths properly chargeable to the group have occurred in other places and after adding these and deducting deaths of residents of incorporated places there is a net increase of seventeen, giving a death rate of 6.2 per 100,000, which at that is the lowest of any group of the series. Several outbreaks have occurred during the year, two of which, Wellsville and Millbrook, have been previously mentioned. Others noted were in the towns of Colonie and Bethlehem, Albany county, Skaneateles, Onondaga county and in several institutions to be noted later. Most of the Colonie cases were found to be due to the use of water from a well used in common by a number of families in the unincorporated village of Menands. The few cases later in the year contracted the disease through the use of Watervliet water. The Skaneateles cases were located in the unincorporated village of Skaneateles Falls but no definite evidence as to the source was obtained. A milk-borne outbreak of sixteen cases occurred in the town of Bethlehem, Albany county, in November due to an unrecognized case on a dairy farm. Outbreaks occurred in the following institutions not under state management; Trudeau Sanatorium (August); Hauppage Orphan Asylum, Smithtown; Colored Orphan Asylum, Smithtown; Wayne County Home, Lyons. In the latter two the sources of infection were definitely traced. The colored orphanage cases were found to be due to eating clams taken from the shore near a sewer outlet. The Wayne County Home outbreak of ten cases, four of whom died, was caused by the habit this institution had of drinking its own sewage in a highly diluted form. Therefore shortly after a case of typhoid fever came to the home others living there began to come down with the disease. An investigation of the water supply and sewerage systems disclosed the fact that the sewers discharge into the Erie canal about thirty-five feet from the intake of an auxiliary water supply pumped through the same pump as the supply used for drinking purposes. The sources of the Trudeau and Hauppage outbreaks were not definitely ascertained. In each of them one of the early cases had

recently come to the institution but it was impossible to connect either of these in any way with the food supply or to account by contact with the explosive nature of the outbreaks. In the Hauppage institution a chronic carrier was found in addition to the possible early carrier referred to but, it was not possible to trace the route of infection if she were the true source. The report of the Trudeau outbreak is given elsewhere in detail.

As previously mentioned, the great bulk of the cases in this group were sporadic cases or groups of two or three. Two hundred and thirty cases were investigated during the year, in 103 of which the modes of infection were definitely ascertained. The most common modes of infection were through water and by contact with a case or a carrier. Of the forty-four cases ascribed to water, 10 were due to municipal supplies, the remainder to wells and, in a few instances, to drinking directly from polluted streams. An almost equal number, 42, were ascribed to contact either with cases or carriers, mostly the former, perhaps on account of their being more apparent. It is very strikingly evident, however, that too little attention is paid by physicians to the possibility of contact infection. Too frequently the care of the primary case devolves upon another member of the household not acquainted with the principles of medical asepsis and blissfully ignorant of the potential dangers of the position. Immunization is not extensively practiced and too frequently the "nurse" is also the cook, with resulting disaster to other members of the household. This sequence of events, while by no means confined to the rural districts, is relatively more frequent there. It is due probably to the lack of trained nurses, the remoteness of hospitals and to a failure to promptly immunize other members of the household. The former may be overcome to some extent by the appointment of county nurses, the latter by the education not only of physicians, but the public at large, in the efficacy and innocuousness of this measure.

There remains to consider 75 cases which occurred in state institutions during the year not included in any of the areas considered. Eight of these institutions had one or more typhoid cases during 1917, but the bulk of the cases occurred in four of these. In the Gowanda State Hospital cases began appearing late

in 1916 and with increasing frequency during January 1917, after which the number rapidly subsided. The outbreak was investigated with inconclusive results. A small outbreak of seven cases occurred at the Raybrook State Tuberculosis Hospital in October and November. Investigation failed to disclose a carrier in the institution but did discover an unlicensed labor camp on the watershed of the institution's water supply. No case or carrier was discovered among the laborers but as there had been changes in the personnel of the camp the possibility could not be ruled out. Both here and at Trudeau the staff and patients were vaccinated against typhoid though at Raybrook only those patients were included who were in fair physical condition. At neither institution have there been any apparent ill result from this procedure.

At the St. Lawrence State Hospital a carrier was found in the dining room of the institution who was held responsible for the occurrence of 12 cases in August and September. At the Central Islip State Hospital cases have occurred with considerable frequency the past two years but without any well marked outbreak. The cases have been confined almost entirely to certain wards occupied by demented patients where the habits of the inmates are conducive to contact infection. An outbreak also occurred in May in Manhattan State Hospital, the cases and deaths being included in the New York City figures. Following this outbreak the State Hospital Commission recommended at the suggestion of this Department the vaccination of all inmates under 50 years of age who had not had typhoid and the vaccination of all new admissions. It is hoped that strict adherence to this procedure will much decrease the typhoid incidence in these institutions and lessen the number of the often difficult and sometimes baffling outbreaks that occur in them.

Vaccination should be practiced more extensively in other institutions to prevent serious results consequent upon sanitary neglect or the accidents due to carriers. In this connection it has been somewhat surprising to discover the small number of hospitals that require their nurses to be vaccinated — but 16 out of 48 replying to a letter requesting this information. Three others urge the procedure and have been successful in

inducing a high percentage to accept and four others require vaccination of nurses attending typhoid cases. In many instances the excuse is given that they treat so few typhoid cases that it is regarded as unnecessary to vaccinate. This point of view entirely overlooks the fact that many cases of typhoid are not recognized as such until some time after their admission and that typhoid vaccine is of doubtful efficacy after the individual has been infected. There is not even this excuse, however, for hospitals having a large number of typhoid admissions every year.

The seasonal incidence for 1917 was the same as for almost every previous year of record — a gradual decline in the number of cases until June after which there is a rapid rise until September following which occurs a sharp fall which in the succeeding months becomes more gradual. Though occasionally modified to the extent of peaking in August or October or reaching a minimum in April or May, it is quite remarkable how closely the curve each year follows an average of the whole. This of course is not peculiar to New York State but is practically universal except for individual communities. The favorite explanation of this fall and rise is, in the largest cities, "vacation typhoid" but this fails to explain the synchronous rise in village and rural typhoid and intensive investigations have shown that the relationship is accidental rather than that of cause and effect. Flies, ground water conditions, increased milk infection and other more or less plausible explanations have been offered but it seems that the question is worthy of more adequate study. In 1917 more than 43 per cent of the up-state cases had their onsets in the three months, August, September and October.

In conclusion, it may be stated that while excellent progress has been made in the past, it is becoming more apparent each year that further reductions can only be hoped for through intensive efforts. The great reduction in the typhoid rates since 1900 has been due in greatest part to the activities of the Engineering Division in improving water supplies and installing sewerage systems. It is for them to hold these gains and effect such further improvement as may be possible through the work that lies within their province. The opportunity is not as great as it

was a decade ago — that is, the results cannot be so dramatic — but the possibilities are doubtless much larger than many surmise. Because typhoid rates are much lower than prior to improvements in their water supplies many cities are content and ascribe their typhoid to anything but water. While these improvements have frequently served to unmask other causes, yet the lowering in the typhoid rates succeeding further improvements have shown that water supplies considered satisfactory by ordinary laboratory test were really the vectors of a considerable amount of the "residual" typhoid.

However, the reduction in the future as in more recent years will depend most upon the work of the health officer. It is principally a matter of stopping numerous small leaks and strengthening weak points before they break. Among the latter, aside from municipal water supplies protected by chlorination only, the most important is probably the unpasteurized milk supply. While but three up-state outbreaks were definitely traced to milk last year it is extremely probable that more or less infection is transmitted in this way without focusing attention on the milk supply and without assuming the proportions of an outbreak. Neither of these two sources affect in any considerable degree the small village and rural typhoid. As previously mentioned the reports of cases investigated have pointed most clearly to contact with previous cases as the commonest mode of transmission. There have been a few small outbreaks definitely traced to infected water supplies but the bulk of the cases it has been impossible to ascribe to any definite source. The ways by which typhoid *may* be transmitted are perfectly apparent in practically every small village and on most farms. In the main they are the improperly located, constructed or protected well, the non-fly-proof privy, the leaching cesspool, the untrained nurse and the neighborly habits of the people. The latter results in an unusual opportunity for direct and indirect contact which is often impossible to trace with certainty. These are all matters dependent upon individual actions and are susceptible of correction, in the main, only through persistent educational effort. That a large degree of success has attained such

efforts in the past is evidenced by the declining rates in these groups.

In large measure, too, the reduction in typhoid throughout the State has been due to the work of the local health officers and it is upon them that the largest measure of dependence must be placed for future improvement. The health officer who awaits the official reports of cases while everyone else in the community is aware of their presence is fortunately becoming less common. In consequence, reports are more promptly made and, as the case fatality rates show, they are more complete. In the present state of sanitary progress this is a fundamentum of all communicable disease control. It prevents the early case becoming the starting point of an epidemic or holds the outbreak to a minimum. This is the first line of defense and it is therefore highly important that these workers be acquainted with methods of investigation and the modes of infection. For this reason it would be desirable if the local health officers were provided with forms upon which could be recorded the data obtained by the investigation of individual cases. A schedule of this kind could be kept as a permanent record and the cases gone over in detail from time to time for the purpose of discovering points in common which easily slip the memory. They would insure also more complete epidemiological data and afford training in its collection. The danger lies in too closely conforming to the schedule — a liability to become mechanical — a failure to follow promising clews and to elaborate essentials. This difficulty could be overcome however by having the sanitary supervisors vise such reports from time to time and suggest promising lines for further inquiry. In the past these investigations, except in the larger cities, have been made ostensibly by the sanitary supervisors or the epidemiologist in person, but taken in conjunction with their many other duties the task is impossibly large. To some extent the supervisors have relied on information furnished by local health officers and the procedure here recommended would be simply an extension of that method. The sanitary supervisors or epidemiologists would still be available for outbreaks or for intensive study in areas of unusual prevalence. During the past year out of 1958 cases outside of the first and second class cities 808 were investigated by representatives of

the department and considerably more than half of these were cases occurring in definite outbreaks. The investigation of the sporadic cases is necessarily made a secondary issue, and incidental to visits made for another primary purpose. As a result the investigations are much delayed, the cases themselves may have died or removed, possible cases or carriers have likewise departed and many points of importance have had a chance to slip the memory. What might have been certainty has become "probability," "possibility" or "unknown."

Table 1

CASES, DEATHS AND RATES FOR IMPORTANT COMMUNICABLE DISEASES BY YEARS IN NEW YORK STATE, UP-STATE AND NEW YORK CITY

	NEW YORK STATE					UP-STATE					NEW YORK CITY				
	Cases	Deaths	Case rate	Death rate	Case fatality rate	Cases	Deaths	Case rate	Death rate	Case fatality rate	Cases	Deaths	Case rate	Death rate	Case fatality rate
TYPHOID FEVER															
1908	6,976	1,375	79	15.7	19.71	3,811	837	91	19.7	21.96	3,165	538	69.9	11.9	16.99
1909	7,897	1,315	88	14.7	16.65	4,284	751	100	17.4	17.53	3,613	564	77.52	12.1	15.61
1910	8,536	1,374	93	15	16.09	4,801	816	110.1	18.7	17	3,735	558	78	11.6	14.93
1911	8,083	1,316	86	14.1	16.28	4,426	771	100.2	17.5	17.42	3,657	545	74	11.1	14.90
1912	6,418	1,128	67	11.8	17.57	3,343	629	74.7	14.1	18.82	3,076	499	61	9.9	16.22
1913	6,248	1,018	64	10.5	16.29	3,605	656	79.6	14.5	18.20	2,643	362	51	7	13.69
1914	5,481	878	55	8.9	16.01	3,221	544	70.2	11.9	16.79	2,260	334	42	6.3	14.77
1915	5,484	775	54	7.7	14.13	3,028	442	65.2	9.5	14.60	2,456	333	45	6.1	13.55
1916	4,417	603	43	5.8	13.66	2,788	388	59	8.3	13.92	1,629	215	29.1	3.8	13.19
1917	4,293	588	41	5.6	13.97	2,851	361	60	7.5	12.59	1,442	229	25.1	4	15.88
DIPHTHERIA															
1908	20,759	2,473	236	28.2	11.91	4,390	710	104	16.7	16.17	16,369	1,763	362	38.9	10.77
1909	20,665	2,313	230	25.8	11.19	4,613	598	112	13.9	12.42	16,052	1,715	344	36.8	10.68
1910	22,630	2,433	247	26.6	10.75	5,404	718	124	16.5	13.29	17,226	1,715	359	35.8	9.95
1911	20,007	1,963	214	21	9.81	6,523	679	148	15.4	10.41	13,484	1,284	273	26	9.52
1912	18,927	1,624	198	17	8.58	5,394	498	121	11.1	9.23	13,533	1,126	267	22.2	8.32
1913	20,247	1,853	208	19.1	9.15	5,662	519	125	11.5	9.17	14,585	1,334	277	25.7	9.14
1914	22,537	2,015	227	20.3	8.94	5,408	523	118	11.4	9.68	17,129	1,492	321	28	8.71
1915	20,806	1,770	206	17.5	8.51	5,527	492	119	10.6	8.69	15,279	1,278	279	23.4	8.36
1916	19,133	1,524	186	14.8	7.97	5,612	493	119	10.5	8.78	13,521	1,034	241	18.4	7.64
1917	19,183	1,745	183	16.6	9.10	6,559	589	138	12.4	8.98	12,624	1,156	220	20.1	9.15
TUBERCULOSIS (ALL FORMS)															
1908	26,230	16,550	299	188.5	63.10	3,310	6,379	78	150	192.71	22,920	10,171	506	224.7	44.37
1909	32,915	16,117	367	179.8	48.96	6,937	6,168	161	143.3	88.91	25,979	9,949	557	213.5	38.28
1910	37,963	16,337	415	178.5	43.03	5,957	6,263	137	143.7	105.13	32,006	10,074	667	210.1	31.47
1911	33,299	16,548	356	177.1	49.69	8,796	6,299	199	142.7	71.61	24,513	10,249	497	207.9	41.81
1912	30,529	15,989	320	167.7	52.37	7,777	6,011	174	134.5	77.29	22,752	9,978	449	197	43.85
1913	31,123	16,152	320	166 1	51.89	8,449	6,129	187	135.4	72.54	22,674	10,023	436	192.8	44.20

1914	31,128	16,559	314	167	53.20	9,472	6,270	207	136.8	66.19	21,602	10,289	405	192.9	47.62
1915	33,736	16,445	335	162.7	48.74	11,595	6,195	250	133.5	53.43	22,141	10,250	405	187.4	46.29
1916	32,059	15,820	311	153.6	49.34	12,767	6,178	272	131.5	48.39	19,292	9,642	344	172.1	49.97
1917	28,686	16,556	273	157.8	57.71	11,272	6,417	237	135	56.92	17,414	10,139	303	176.7	58.22
MEASLES															
1908	58,738	1,175	669	13.4	2	20,265	203	476	4.8	1	38,473	972	850	21.5	2.52
1909	52,863	1,272	590	14.2	2.4	21,072	276	489	6.4	1.3	31,791	996	682	21.4	3.13
1910	69,878	1,285	763	14	1.83	34,062	511	782	11.7	1.5	35,816	774	747	16.1	2.16
1911	48,675	977	521	10.5	2	22,792	319	516	7.2	1.4	25,883	658	525	13.3	2.54
1912	65,060	1,050	682	11	1.60	26,042	377	582	8.4	1.45	39,018	673	770	13.3	1.72
1913	65,374	1,072	672	11	1.63	36,024	444	796	9.8	1.23	29,350	628	564	12.1	2.13
1914	47,883	839	483	8.5	1.75	22,090	280	482	6.1	1.27	25,793	559	484	10.5	2.16
1915	62,660	844	620	8.3	1.34	24,474	214	527	4.6	.87	38,186	630	698	11.5	1 64
1916	67,110	928	651	9	1.38	45,507	439	969	9.3	.96	21,603	489	386	8.7	2.26
1917	60,860	892	580	8.5	1.46	33,341	335	701	7	1	27,519	557	479	9.7	2.02
SCARLET FEVER															
1908	30,403	1,668	346	19.2	5.48	7,467	341	176	8.5	4.57	22,936	1,327	507	29 3	5.78
1909	22,747	1,204	254	13.4	5.29	9,743	517	226	9.7	5.31	13,004	787	279	16.9	6.05
1910	31,504	1,616	344	17.7	5.12	12,220	664	280	15.3	5.43	19,284	952	402	19.9	4.93
1911	25,830	1,149	276	12.3	4.44	10,037	408	227	9.2	4.06	15,793	741	320	15	4.69
1912	18,579	789	195	8.3	4.24	5,863	174	131	3.9	2.97	12,716	615	251	12.1	4.83
1913	17,263	837	177	8.6	4.84	6,524	330	144	7.3	5.06	10,739	507	206	9.8	4.72
1914	18,596	687	187	6.9	3.69	7,491	235	163	5.1	3.14	11,105	452	208	8.5	4.07
1915	15,802	409	156	4.1	2.58	5,923	118	128	2.7	1.99	9,879	291	181	5.3	2.94
1916	11,083	178	108	1.7	1.61	5,768	82	112	1.7	1.55	5,815	96	104	1.7	1.65
1917	15,234	261	145	2.5	1.71	9,174	139	193	2.9	1.51	6,060	122	105	2.1	2.01
WHOOPING COUGH															
1908	.....	503	.....	5.7	.....	.....	318	.....	7.5	.....	.....	185	.....	4.1	.....
1909	.....	783	.....	8.7	.....	.....	382	.....	8.9	.....	.....	401	.....	8.6	.....
1910	.....	727	.....	7.9	.....	.....	433	.....	9.9	.....	.....	294	.....	6.1	.....
1911	8,362	819	89	8.8	9.79	5,116	436	116	9.9	8 46	3,246	383	66	7.8	11.79
1912	7,821	683	82	7.2	8.73	5,638	392	126	8.8	6.90	2,183	291	43	5.7	13.33
1913	9,018	822	93	8.5	9.11	5,520	402	122	8.9	7.21	3,498	420	67	8.1	12.00
1914	11,651	730	117	7.4	6.26	7,853	451	171	9.8	5.74	3,798	279	71	5.2	7.34
1915	13,338	759	132	7.5	5.69	6,567	363	141	7.8	5.38	6,771	396	124	7.2	5.84
1916	17,297	745	168	7.2	4.30	9,837	393	209	8.4	3.99	7,460	352	133	6.3	4.71
1917	18,355	886	175	8.4	4.82	12,758	401	268	8.4	3.14	5,597	485	97	8.4	8.66

Table 2

IMPORTANT COMMUNICABLE DISEASES REPORTED BY MONTHS FOR UP-STATE, NEW YORK CITY AND TOTAL, 1908–1917

	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	Up-State	New York City	Total	Up-State	New York City	Total	Up-State	New York City	Total	Up-State	New York City	Total	Up-State	New York City	Total	Up-State	New York City	Total
TUBERCULOSIS																		
1908	256	1,609	1,865	284	1,518	1,802	330	2,445	2,775	279	1,937	2,216	309	1,673	1,982	347	1,674	2,021
1909	1,469	2,270	3,739	587	1,765	2,352	592	2,505	3,097	563	2,452	3,015	374	2,297	2,671	485	2,298	2,783
1910	167	2,249	2,416	458	2,745	3,203	523	3,974	4,497	451	3,518	3,969	452	2,966	3,418	514	2,178	2,692
1911	658	2,380	3,038	802	2,860	3,662	879	2,340	3,219	706	2,068	2,774	881	2,638	3,519	629	1,745	2,374
1912	515	2,012	2,527	577	2,053	2,630	657	2,030	2,687	611	1,985	2,596	706	2,299	3,005	779	1,836	2,615
1913	750	2,015	2,765	651	1,883	2,534	653	2,460	3,113	658	2,353	3,011	617	2,019	2,636	647	1,927	2,574
1914	779	1,699	2,478	676	1,565	2,241	808	1,954	2,762	878	1,955	2,833	750	1,974	2,724	877	2,037	2,914
1915	721	1,849	2,570	694	2,009	2,703	1,034	2,303	3,337	950	2,202	3,152	914	1,985	2,899	967	1,880	2,847
1916	902	1,613	2,515	1,203	1,638	2,841	1,106	2,053	3,159	1,259	1,749	3,008	1,344	1,602	2,946	1,444	1,800	3,244
1917	986	2,011	2,997	1,027	1,292	2,319	1,015	2,000	3,015	1,023	1,174	2,197	1,055	1,266	2,321	1,056	1,310	2,366
TYPHOID FEVER																		
1908	288	146	434	293	125	418	217	140	357	174	111	285	191	121	312	236	176	412
1909	316	199	515	243	98	341	262	127	389	181	77	258	171	190	361	173	163	336
1910	302	154	456	272	294	566	305	152	457	202	120	322	187	187	374	188	168	356
1911	310	110	420	380	141	521	352	97	449	246	100	346	217	147	364	213	199	412
1912	245	238	483	174	142	316	235	101	336	309	125	434	287	127	414	125	164	289
1913	178	79	257	143	78	221	124	65	189	337	67	404	256	92	348	136	86	222
1914	203	100	303	163	75	238	226	64	290	229	127	356	232	108	340	178	147	325
1915	180	107	287	157	84	241	159	90	249	104	81	185	125	74	199	160	117	277
1916	140	66	206	148	63	211	100	66	166	179	86	265	157	116	273	194	115	309
1917	178	79	257	210	98	308	212	43	255	150	61	211	119	106	225	143	84	227
DIPHTHERIA																		
1908	451	1,683	2,134	478	1,537	2,015	415	1,893	2,308	250	1,573	1,823	289	1,544	1,833	238	1,284	1,522
1909	480	1,926	2,406	419	1,613	2,032	383	1,735	2,118	303	1,281	1,584	266	1,325	1,591	316	1,583	1,899
1910	504	1,514	2,018	444	1,581	2,025	402	2,087	2,489	403	2,044	2,447	425	2,229	2,654	303	1,532	1,835
1911	602	1,335	1,937	497	1,692	2,189	433	1,350	1,783	382	1,235	1,617	481	1,686	2,167	476	1,152	1,628
1912	738	1,159	1,897	513	1,241	1,754	504	1,386	1,890	379	1,271	1,653	393	1,199	1,592	362	1,215	1,577
1913	549	1,642	2,191	458	1,449	1,907	454	1,455	1,909	413	1,466	1,879	391	1,474	1,865	350	1,310	1,660

1914	515	1,546	2,061	509	1,642	2,151	382	1,512	1,894	306	1,567	1,873	337	1,802	2,139	311	1,737	2,048
1915	560	1,435	1,995	430	1,533	1,963	464	1,610	2,074	319	1,352	1,671	392	1,341	1,733	336	1,634	1,970
1916	593	1,572	2,165	382	1,485	1,867	405	1,570	1,975	359	1,329	1,688	437	1,715	2,152	422	1,570	1,992
1917	635	1,109	1,744	521	1,194	1,715	556	1,211	1,767	458	1,132	1,590	444	1,267	1,711	384	1,198	1,582
MEASLES																		
1908	2,408	3,388	5,796	3,011	4,972	7,981	3,713	8,306	12,019	4,141	7,060	11,201	3,803	5,974	9,777	1,389	3,852	5,241
1909	2,030	2,336	4,366	2,498	2,263	4,761	2,493	4,383	6,876	2,213	4,840	7,053	2,122	4,911	7,033	1,950	6,203	8,153
1910	5,991	3,735	9,726	5,481	4,566	10,047	5,565	8,205	13,770	3,895	6,036	9,931	4,065	6,425	10,490	3,608	3,229	6,837
1911	2,765	1,303	4,068	2,920	2,059	4,979	3,991	2,756	6,657	4,003	4,027	8,030	3,816	6,543	10,359	1,932	3,445	5,377
1912	2,161	2,670	4,831	2,207	4,219	6,426	3,008	7,713	10,721	3,404	7,938	11,342	4,012	7,272	11,284	3,390	4,132	7,522
1913	4,483	2,125	6,609	5,751	2,169	7,920	5,508	4,369	9,877	5,356	5,256	10,611	4,886	6,231	11,117	3,786	4,471	8,257
1914	2,847	1,519	4,366	3,068	2,190	5,258	3,506	3,483	6,989	3,407	4,485	7,892	3,393	5,483	8,876	2,353	4,094	6,447
1915	1,241	1,355	2,596	1,469	2,067	3,536	1,672	5,053	6,725	2,512	7,849	10,361	3,260	9,088	12,348	3,282	7,602	10,884
1916	5,170	1,242	6,412	5,456	1,894	7,344	6,908	3,281	10,189	7,553	4,208	11,761	7,418	4,579	11,997	6,180	3,393	9,573
1917	2,492	899	3,391	3,136	1,871	5,007	3,988	3,914	7,902	4,817	4,634	9,451	5,976	5,736	11,712	5,208	4,355	9,563
SCARLET FEVER																		
1908	675	2,512	3,187	697	3,221	3,918	917	4,914	5,831	638	2,774	3,412	778	3,769	4,547	467	1,781	2,248
1909	1,039	1,657	2,696	1,019	1,498	2,517	1,211	1,964	3,175	1,120	1,355	2,475	933	1,317	2,253	794	1,096	1,890
1910	1,421	2,234	3,655	1,884	2,681	4,565	1,782	3,564	5,346	1,421	2,991	4,412	1,327	2,734	4,061	882	1,604	2,486
1911	1,289	1,795	3,084	1,246	2,593	3,839	1,732	2,395	4,127	1,316	2,433	3,749	1,185	2,858	4,043	626	1,187	1,813
1912	803	1,113	1,916	806	1,545	2,351	912	2,229	3,141	791	1,990	2,781	627	1,694	2,321	368	1,138	1,506
1913	716	1,505	2,221	746	1,437	2,182	878	1,852	2,730	768	1,526	2,294	792	1,245	2,037	563	747	1,310
1914	717	1,252	1,969	749	1,368	2,117	987	1,677	2,664	834	1,599	2,433	789	1,709	2,489	565	951	1,516
1915	691	1,094	1,785	651	1,201	1,852	660	1,592	2,252	700	1,731	2,431	676	1,392	2,068	450	987	1,437
1916	627	680	1,307	536	753	1,289	619	948	1,567	644	842	1,486	579	792	1,371	414	489	903
1917	872	578	1,450	1,049	657	1,706	1,615	622	2,237	1,651	775	2,426	873	872	1,745	564	515	1,079
WHOOPING COUGH																		
1908																		
1909																		
1910																		
1911	399	335	734	331	432	763	514	423	937	471	267	738	539	450	989	495	258	753
1912	789	187	976	598	173	771	463	246	709	578	200	778	598	327	925	522	231	753
1913	462	198	660	395	262	657	416	323	739	321	543	864	382	503	885	482	382	864
1914	850	226	1,076	641	258	899	902	275	1,177	940	489	1,429	1,166	387	1,553	914	393	1,307
1915	587	310	897	602	409	1,011	612	489	1,101	469	559	1,028	444	637	1,081	486	701	1,187
1916	952	465	1,417	794	526	1,320	868	930	1,798	795	1,094	1,889	1,099	1,140	2,239	1,011	1,033	2,044
1917	676	122	798	790	153	943	860	177	1,037	1,164	285	1,449	1,248	418	1,666	1,163	511	1,674

Table 2

IMPORTANT COMMUNICABLE DISEASES REPORTED BY MONTHS FOR UP-STATE, NEW YORK CITY AND TOTAL, 1908–1917 — *Concluded*

	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER			TOTAL		
	Up-State	New York City	Total	Up-State	New York City	Total	Up-State	New York City	Total	Up-State	New York City	Total	Up-State	New York City	Total	Up-State	New York City	Total	Up-State	New York City	Total
TUBERCULOSIS																					
1908	137	2,160	2,297	207	1,755	1,962	226	2,431	2,657	305	2,023	2,328	271	1,826	2,097	359	1,869	2,228	3,310	22,920	26,230
1909	725	1,913	2,638	516	2,013	2,529	312	2,352	2,664	437	1,839	2,276	469	2,483	2,943	422	1,786	2,208	6,936	25,979	32,915
1910	490	2,131	2,621	486	2,899	3,385	454	2,402	2,856	710	1,974	2,684	511	2,729	3,240	742	2,250	2,992	5,957	32,006	37,963
1911	826	1,773	2,599	721	2,309	3,030	627	1,768	2,395	605	1,593	2,198	701	2,033	2,734	751	1,690	2,441	8,786	25,197	33,983
1912	789	1,834	2,623	601	1,716	2,317	651	1,806	2,457	790	1,860	2,650	547	1,589	2,136	554	1,731	2,285	7,777	22,752	30,529
1913	1,673	1,868	2,941	647	1,515	2,162	675	1,666	2,339	753	1,773	2,526	643	1,663	2,306	684	1,532	2,216	8,449	22,674	31,123
1914	726	1,763	2,489	678	1,675	2,353	756	1,772	2,528	1,145	1,867	3,012	709	1,548	2,257	744	1,787	2,531	9,526	21,602	31,128
1915	901	1,818	2,719	1,181	1,487	2,668	992	1,935	2,927	989	1,615	2,604	1,109	1,448	2,548	1,152	1,610	2,762	11,595	22,141	33,736
1916	1,114	1,418	2,532	1,090	1,505	2,595	930	1,531	2,461	828	1,322	2,150	827	1,475	2,302	726	1,586	2,306	12,767	19,292	32,059
1917	1,006	1,469	2,475	954	1,804	2,758	820	1,119	1,939	891	1,491	2,382	757	1,385	2,142	682	1,093	1,775	11,272	17,414	28,686
TYPHOID FEVER																					
1908	211	306	517	449	507	956	532	665	1,197	541	382	923	342	244	586	337	242	579	3,811	3,165	6,976
1909	256	218	474	476	375	851	761	1,119	1,880	667	453	1,120	435	432	867	343	162	505	4,284	3,613	7,897
1910	240	246	486	586	617	1,203	843	614	1,457	780	513	1,293	521	468	989	370	202	577	4,801	3,735	8,536
1911	313	328	641	641	766	1,407	649	519	1,168	463	430	893	312	480	792	328	342	670	4,426	3,657	8,083
1912	248	273	521	422	585	1,007	444	538	982	446	390	836	215	198	413	192	195	387	3,342	3,076	6,418
1913	280	137	417	391	229	620	610	728	1,338	546	631	1,177	319	289	608	285	162	447	3,605	2,643	6,248
1914	216	200	416	391	303	694	519	470	989	439	337	776	251	170	421	174	159	333	3,221	2,260	5,481
1915	238	191	429	422	509	931	444	423	867	403	429	832	309	184	493	327	167	494	3,028	2,456	5,484
1916	248	132	380	393	258	651	514	281	795	307	223	530	216	133	349	192	90	282	2,788	1,629	4,417
1917	232	93	325	373	185	558	502	365	867	363	178	541	220	87	307	149	63	212	2,851	1,442	4,293
DIPHTHERIA																					
1908	108	1,043	1,151	186	601	787	324	1,091	1,415	567	1,238	1,805	613	1,347	1,960	471	1,535	2,006	4,390	16,369	20,759
1909	267	859	1,126	239	677	916	317	974	1,291	458	963	1,421	584	1,715	2,299	581	1,401	1,982	4,613	16,052	20,665
1910	248	1,220	1,468	331	1,032	1,363	358	652	1,010	577	932	1,509	769	1,375	2,144	640	1,028	1,668	5,404	17,226	22,630
1911	398	811	1,209	435	914	1,349	539	613	1,152	703	753	1,456	790	1,214	2,004	787	1,139	1,926	6,523	13,894	20,417
1912	282	.....	282	287	764	1,051	320	656	976	512	1,127	1,639	582	1,310	1,892	522	1,416	1,938	5,394	12,747	18,141
1913	325	962	1,287	271	715	986	397	734	1,131	713	918	1,631	532	806	1,338	809	1,654	2,463	5,662	14,585	20,247

1914	222	1,396	1,618	266	838	1,104	417	941	1,358	693	1,271	1,964	852	1,364	2,216	598	1,513	2,111	5,408	17,129	22,537
1915	268	1,120	1,388	250	768	1,018	381	722	1,103	713	1,081	1,794	760	1,293	2,053	654	1,390	2,044	5,527	15,279	20,806
1916	354	1,064	1,418	317	511	828	369	433	802	632	608	1,240	669	734	1,403	673	930	1,603	5,612	13,521	19,133
1917	369	934	1,303	350	660	1,010	516	680	1,196	880	1,086	1,966	798	1,091	1,889	648	1,062	1,710	6,559	12,624	19,183
MEASLES																					
1908	313	1,587	1,900	142	373	515	74	375	449	141	465	606	403	744	1,147	727	1,376	2,103	20,265	38,473	58,738
1909	743	1,952	2,695	243	788	1,031	239	449	688	724	436	1,160	1,919	1,338	3,257	3,898	1,892	5,790	21,072	31,791	52,863
1910	1,215	1,259	2,474	321	561	883	220	232	452	442	280	722	1,011	582	1,593	2,247	706	2,953	34,062	35,816	69,878
1911	886	1,858	2,744	230	790	1,020	148	317	465	387	355	742	674	803	1,477	1,130	1,627	2,757	22,792	25,883	48,675
1912	1,702	1,982	3,684	552	604	1,156	354	221	575	886	317	1,203	1,716	769	2,485	2,650	1,420	4,070	26,042	39,257	65,299
1913	1,720	1,991	3,711	411	576	987	307	283	590	1,136	384	1,520	1,086	548	1,634	1,596	946	2,541	36,024	29,350	65,374
1914	1,139	1,734	2,873	589	534	1,123	289	244	533	347	324	671	378	679	1,057	774	1,024	1,798	22,090	25,793	47,883
1915	1,789	2,486	4,275	636	614	1,250	343	276	613	987	326	1,312	2,804	581	3,385	4,480	895	5,375	24,474	38,186	62,660
1916	3,399	1,815	5,214	656	417	1,073	226	119	345	323	74	397	848	127	975	1,376	456	1,832	45,507	21,603	67,110
1917	2,244	1,368	3,612	474	486	960	311	214	525	656	362	1,018	1,384	870	2,254	2,656	2,816	5,471	33,341	27,519	60,860
SCARLET FEVER																					
1908	72	841	913	240	333	573	439	533	972	708	546	1,254	952	706	1,658	884	1,006	1,890	7,467	22,936	30,403
1909	363	361	724	319	289	608	376	378	754	646	505	1,150	815	1,147	1,962	1,106	1,437	2,543	9,743	13,004	22,747
1910	445	542	987	296	392	688	277	302	579	584	340	924	889	784	1,673	1,014	1,116	2,128	12,220	19,284	31,504
1911	321	453	774	191	302	493	244	209	453	499	383	882	608	665	1,273	780	785	1,565	10,037	16,058	26,095
1912	223	532	755	144	279	423	199	254	453	298	371	669	287	619	906	405	1,078	1,483	5,863	12,842	18,705
1913	308	355	663	204	232	436	282	253	535	350	313	663	379	488	867	538	786	1,324	6,524	10,739	17,263
1914	324	477	801	363	144	507	355	239	594	509	390	899	643	602	1,245	665	797	1,462	7,491	11,205	18,696
1915	267	409	676	166	179	345	173	147	320	397	232	629	487	395	882	605	520	1,125	5,923	9,879	15,802
1916	229	300	529	118	78	196	152	72	224	295	159	454	465	267	732	570	435	1,005	5,268	5,815	11,083
1917	308	267	575	171	105	276	258	178	436	465	345	810	667	527	1,194	681	619	1,300	9,174	6,060	15,234
WHOOPING COUGH																					
1908	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1909	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1911	414	223	637	341	265	606	234	161	395	261	133	394	568	183	751	549	116	665	5,116	3,246	8,362
1912	499	201	700	336	136	472	254	114	368	292	113	405	329	129	458	380	126	506	5,638	2,183	7,821
1913	408	281	689	597	202	799	300	215	515	359	184	543	608	242	850	790	163	953	5,520	3,498	9,018
1914	448	318	766	381	374	755	256	286	542	262	336	598	411	253	664	682	229	911	7,853	3,818	11,671
1915	596	806	1,402	467	806	1,273	277	630	907	578	493	1,071	657	468	1,125	792	463	1,255	6,567	6,771	13,338
1916	1,282	968	2,250	933	755	1,688	509	246	755	460	121	581	584	97	681	556	85	635	9,837	7,460	17,297
1917	1,565	771	2,336	1,025	1,018	2,043	833	566	1,399	1,147	435	1,582	1,223	577	1,800	1,064	564	1,628	12,758	5,597	18,355

Table 3

TYPHOID FEVER — CASES AND DEATHS IN COUNTIES GROUPED BY POPULATION, 1917

COUNTY	175,000 to 1,000,000		50,000 to 175,000		20,000 to 50,000		10,000 to 20,000		7,500 to 10,000		5,000 to 7,500		2,500 to 5,000		1,000 to 2,500		500 to 1,000		Under 500		Towns		Institutions		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Albany			138	13	9	3	203	1					6	0	5	1	2	1			54	3			417	22
Allegany													16	3	3		0		1		21	1			38	4
Broome			15	7							2	0			1	1	2	0	0	0	7	0			24	8
Cattaraugus							5	1	2	0					2	1	0	0	0	0	6	0			15	2
Cayuga					10	2									1	0					8	1			19	3
Chautauqua					17	2	7	2			6	0	8	0	5	0	3	0			11	1			57	5
Chemung					40	5									2	0					3	0			45	5
Chenango									5	0					12	3			1	0	9	0			27	3
Clinton							19	4							11	3	1	0			14	2			45	9
Columbia							16	2							2	0					14	2			32	4
Cortland							10	1							1	0	1	0			4	0			16	1
Delaware													2	1	1	1					13	4			16	6
Dutchess					15	3	2	0					2	0	16	0					23	2			58	5
Erie	213	47					17	0	19	0	4	0	5	1			2	0			21	1	31	7	231	49
Essex													7	0	1	0			2	0	29	2	7	1	34	2
Franklin											17	5	1	0							11	3			29	8
Fulton					3	1											1	0			3	0			7	1
Genesee							12	1					12	2					1	0	6	0			31	3
Greene											14	1			7	0					18	2			39	3
Hamilton																					4	0			4	0
Herkimer							6	3	5	0			1	0			1	0			15	1			28	4
Jefferson					36	3							5	0	15	0	1	1	1	0	14	1			73	5
Lewis													1	0			1	0			5	3			7	3
Livingston																	1	0	1	0	3	1			5	1
Madison									1	0			1	0	0	1					5	1			7	2
Monroe	72	8											6	0			2	0			12	1			92	9
Montgomery					7	0							1	0	3	1					1	0			12	1
Nassau											2	0			1	1					12	0			15	1
Niagara					47	5	42	8									1	0			7	2			97	15
Oneida			75	11	14	3									8	1	1	0	1	0	21	3	1	0	126	18
Onondaga			26	16							3	2			3	0	1	0			42	5			75	17
Ontario							28	2	2	1					4	0			1	0	14	1			49	4
Orange					5	0	21	1	2	0	1	0	5	1	2	0	1	1			14	3			31	6

Orleans												2	0			3	0					10	1			15	1
Oswego					12	1	2	0								1	0	1	0			13	0			29	1
Otsego							4	1						2	1	1	0	6	0			16	2			28	4
Putnam																						2	0			2	0
Rensselaer			86	21			10	1				3	0					1	0			23	1			123	23
Rockland														8	4	2	1	1	0			8	1			15	6
St. Lawrence							3	2						31	2			5	0	1	0	28	4	17	2	66	8
Saratoga							8	1	37	4				5	0	7	1					18	4			76	10
Schenectady			38	8										7	0							2	0			48	5
Schoharie																4	0	2	0			4	1			11	1
Schuyler														3	0							4	1			7	1
Seneca												1	0	2	0			3	1			5	2	4	0	11	3
Steuben							17	4						4	0	10	2	2	0			16	0			45	6
Suffolk														4	1							111	4	15	2	115	5
Sullivan																1	0					14	2			15	2
Tioga												7	1	3	1			1	0			5	3			16	5
Tompkins							18	3								1	1					4	1			29	5
Ulster					31	3								2	0	1	1	1	0			33	5			68	9
Warren							9	2														11	1			23	3
Washington												2	0	13	2					2	1	9	1			26	4
Wayne												1	0	0	0	1	0					35	2			43	2
Westchester			16	6	26	5	16	0				11	2	7	2	4	0					7	1			87	16
Wyoming														1	0							1	0			2	0
Yates														8	0	1	0			2	0	13	0			24	0
Total	285	55	390	73	272	36	456	40	73	5	76	11	174	21	146	19	42	4	14	1	843	83	75	12	2,776	349
Total institutions																							75	12	75	12
Grand total																									2,851	361

Table 4

TYPHOID FEVER — CASES AND DEATHS IN COUNTIES GROUPED BY POPULATION, 1916

COUNTY	175,000 to 1,000,000		50,000 to 175,000		20,000 to 50,000		10,000 to 20,000		7,500 to 10,000		5,000 to 7,500		2,500 to 5,000		1,000 to 2,500		500 to 1,000		UNDER 500		TOWNS		INSTITUTIONS		TOTAL	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Albany			83	9	10	3	53	5					6	1	3	1	1	1			34	2			190	22
Allegany													13	0	5	0	0	0	1	0	35	7			54	7
Broome			14	6							2	1			0	0	1	0	0	1	12	3	0		29	11
Cattaraugus							16	0	8	2			0	0	3	0	1	0	0	0	13	3			41	5
Cayuga					15	5									4	2	0	0	0	0	12	1	1	0	31	8
Chautauqua					16	3	10	2			3	0	3	1	0	0	11	0			18	1			61	7
Chemung					45	4							4	0							6	0			55	4
Chenango							3	0							4	2			1	0	7	1			15	3
Clinton							21	2							7	0					16	0	0		44	2
Columbia							15	2							2	0	2	0			20	0			39	2
Cortland							6	1					1	2			4	0			12	1			23	4
Delaware													7	1	1	0					21	2			29	3
Dutchess					7	2	5	1					12	1	18	2					8	0	0		50	6
Erie	278	56					45	1	34	2			2	1			4	0			24	1	14	0	387	55
Essex													2	1			0	1	1	0	8	2			11	4
Franklin											15	2	6	0			3	0			22	1			46	3
Fulton					14	1	5										1	1			5	3			23	5
Genesee							44	4					1				2		0	1	2	0			49	5
Greene											11	2	9	0			0	1			6	3			26	6
Hamilton																					13	1			13	1
Herkimer							15	1	0	2			1	0			1	0			7	1			24	4
Jefferson					42	6							6	0	15	3	2	0			9	0			77	9
Lewis													4	0							5	1			9	1
Livingston													3	0	1	0	1	0	2	0	1	0			8	0
Madison									4	1			1	0	1	0	1	0	1	0	6	1			14	2
Monroe	74	15											6	0			3	0			32	1			115	14
Montgomery					16	3															6	0			25	3
Nassau											5	0	2	0	7	1					16	2			30	3
Niagara					16	5	116	10							5	2					9	0			140	17
Oneida			14	5	14	3									7	1	4		1		19	2	1	0	59	15
Onondaga			41	19							2	1	6	1	2	1	1				34	6	2	0	92	28
Ontario							16	1	13	3					6	2					10	0			45	6
Orange					9	1	3	2	1	0	1	0	2	0	2	0	1	0			24	2	2	0	43	5

Orleans											5	0			1	1					9	2			15	3
Oswego					11	3	13	2							3	1	2	0			14	1			43	7
Otsego							7	5					1	2	2	0	8	0	1	1	20	2			38	8
Putnam															1	0	1	0			3	0			5	0
Rensselaer			44	15			4	1			5	0			1	0					18	1			72	17
Rockland											1	0	8	1							12	2			21	3
St. Lawrence							9						21	0	3	0	1	0	3	0	57	4	1	0	94	4
Saratoga							13	3	27	1			2	2	10	0					15	0			67	6
Schenectady			33	5																	3	0			36	5
Schoharie																	2	0			4	2			6	2
Schuyler													5	0	1	0					4	0			10	0
Seneca																					7	1	4	2	7	1
Steuben							51	6					5	1			1	0			22	1			82	8
Suffolk													6	0							30	5	23	6	36	5
Sullivan															3	0					19	0			22	6
Tioga											1	0	2	0			3	0			6	1			12	1
Tompkins							14	1									5	1	1	0	7	0			27	2
Ulster					55	6							5	0	1	0					17	1			78	7
Warren							6	5													13	1			19	4
Washington													20	1	5	2					15	2			40	5
Wayne											3	0	2	0	2	1					18	2			25	3
Westchester			15	2	2	2	41	4			7	1	9	0	3	0					13	1	1		112	10
Wyoming													2	0	2	1	2	0	1	0	11	1			18	2
Yates													1	1					1	0	5	0			7	1
Total	352	65	250	65	300	4	523	55	10	11	61	7	186	17	131	23	69	5	14	3	814	84			2,790	380
Total institutions																							49	8	49	8
Grand total																									2,839	388

Table 5

TYPHOID FEVER — CASES AND DEATHS IN COUNTIES GROUPED BY POPULATION, 1915

COUNTY	175,000 to 1,000,000		50,000 to 175,000		20,000 to 50,000		10,000 to 20,000		7,500 to 10,000		5,000 to 7,500		2,500 to 5,000		1,000 to 2,500		500 to 1,000		UNDER 500		TOWNS		INSTITUTIONS		TOTAL	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Albany			58	14	15	4	35	6					10	2	5						24	1			147	27
Allegany													13	2	6						30	2			49	4
Broome			47	5							16	1			5						8	1			76	7
Cattaraugus							16	2	1	0			5	0	2	1					27	6			46	9
Cayuga					55	9									5	1	2	0	1	0	15	4			78	14
Chautauqua					17	2	1	3			0	1	9	1	3	0	2	0			6	1			38	8
Chemung					48	5							8	0	2	0					2	3			67	8
Chenango									7	0					8	1					7	1			22	2
Clinton							15	3							4	1					19	1			37	5
Columbia							15	4							3	0					13	0			32	4
Cortland							9	1					5	0							3	0			17	1
Delaware													7	0	2	0					34	5			43	5
Dutchess					21	8	5	1							3	1	1	0			18	7			46	17
Erie	261	47					7	1	7	0	3	1			8	0					19	4	4	0	305	53
Essex													7	1	1	0					13	0			21	1
Franklin											7	1	3	1			1	1			28	4			39	7
Fulton					3	0	0	1					1	0	1	0					3	2			8	3
Genesee							9	0					2	0	2	1	2	0			13	1			28	2
Greene											10	2			3	1					8	2			21	5
Hamilton																					2	0			2	0
Herkimer							16	1	7	0			3	0			0	1			11	1			37	3
Jefferson					78	6							2	0	33	2	10	0	0	1	17	5			140	14
Lewis																					3	1			3	1
Livingston													1	1	3	0					9	1			13	2
Madison									1	0			0	1	2	0			2	1	7	1			12	3
Monroe	128	15											4	0	1	0	1	0			23	3			157	18
Montgomery					22	4							5	0			1	0			0	0			28	4
Nassau											6	0			5	3					16	2			27	5
Niagara					10	0	47	5							2	1	5	1			6	2			70	9
Oneida			14	3	7	2									5	0					23	4			49	9
Onondaga			85	9							1	0	3	0	5	0	4	0	2	0	31	1	1	0	131	10
Ontario							1	2	5	2					1	0					6	2			13	6
Orange					40	6	12	2	2	2	2	0	1	1	6	1	2	0			42	2			107	14

Orleans																	5	1	1	0			13	3			19	4
Oswego					22	4	10	3											1	1			6	3			39	11
Otsego							16	4									2	0	4	0	1	0	15	3			38	7
Putnam																			0	1			13	1			22	2
Rensselaer			48	17			13	2			5	0					1	1					19	4			86	24
Rockland													7	4			1	1			0	1	6	0			14	6
St. Lawrence							6	1					19	2					3	0	3	0	38	5	1	0	69	8
Saratoga							21	3	8	1			8	6	2	1							18	1			57	6
Schenectady			88	11									3	0									5	0			96	11
Schoharie															5	1							15	3			20	4
Schuyler													3	0							1	0	11	0			15	0
Seneca													6	0									4	1	6	0	10	1
Steuben							61	2					1	0	20	2							14	2			96	6
Suffolk													6	1									12	2	7	1	18	3
Sullivan															5	1							35	6			40	7
Tioga											7	0	1	1									6	1			14	2
Tompkins							27	5											2	0			8	1			37	6
Ulster					42	3							7	2					2	0			11	3			62	8
Warren							20	2															9	0			29	2
Washington											2	0	55	2	19	3							25	5			101	10
Wayne													11	0	3	0							28	3			42	3
Westchester			20	8	44	7	48	6			6	2	1	0	7	0							40	3			166	26
Wyoming													0	1	2	0							6	1			2	2
Yates													1	0	0	1					2	0	1	1			4	2
Total	389	62	360	67	424	60	408	60	38	5	65	8	213	23	108	26	53	5	12	3	845	122					3,065	441
Total institutions																									19	1		
Grand total																											3,624	442

Table 6

TYPHOID FEVER — CASES AND DEATHS IN COUNTIES GROUPED BY POPULATION, 1914

COUNTY	175,000 to 1,000,000		50,000 to 175,000		20,000 to 50,000		10,000 to 20,000		7,500 to 10,000		5,000 to 7,500		2,500 to 5,000		1,000 to 2,500		500 to 1,000		UNDER 500		TOWNS		INSTITUTIONS		TOTAL	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Albany			68	17	13	5	51	5					2	1			1	0			21	1			156	29
Allegany													15	4	3	0					25	3			43	7
Broome			20	7							6	1			2	1	1	1			9	0			38	19
Cattaraugus							15	1	6	0					2	1	1	1			23	1			47	4
Cayuga					18	4									1	2			2	0	26	3			47	9
Chautauqua					15	3	163	8			0	1	1	1	8	0	5	0			6	2			198	15
Chemung					43	5							1	0	1	1					6	0			51	6
Chenango									5	1					11	0					10	2			26	3
Clinton							0	1							1	0					13	2			14	3
Columbia							45	4							0	1	3	0			20	2			68	7
Cortland							15	1					6	0			1	0			12	2			34	3
Delaware													4	1	4	0	1	0			31	5			40	6
Dutchess					15	1	8	1							6	1					28	1	10	1	57	4
Erie	407	73					14	1	18	4	1	0	4	2							33	2	3	0	477	82
Essex													5	0							9	3			14	3
Franklin											3	3									29	2			32	5
Fulton					10	4	0	1													4	1			14	6
Genesee							22	0					4	1							12	2			38	3
Greene											19	0			10	1					9	3			38	4
Hamilton																					2	1			2	1
Herkimer							2	1	2	1			2	2							13	2			19	6
Jefferson					41	3									17	1	3	0			25	2			86	6
Lewis																	1	0	1	1	7	5			9	6
Livingston													4	0	0	1					9	2	18	13	13	3
Madison									1	0			2	0	0	1	0	1			16	5			19	7
Monroe	120	27											7	0	1	0	2	0			15	2			145	29
Montgomery					9	5							2	2	9	0	4	0	1	0	9	2			34	9
Nassau											2	0	1	0	3	1					8	1			14	2
Niagara					18	5	12	10							1	0	4	0			17	1			169	16
Oneida			7	6	10	4									6	0	4	0			18	0	1	1	45	10
Onondaga			24	15							9	1	4	1	9	1			1	0	21	3			68	21
Ontario							15	4	4	0					3	1					8	0			30	5
Orange					24	7	14	1	7	1	23	4	6	0	3	0					37	7			114	20

Orleans															5	1					6	2			11	3
Oswego					32	6	14	0							2	1	1	0	1	0	25	4			75	11
Otsego							8	2					3	1	1	0	8	1			18	1			38	5
Putnam																					5	0			5	0
Rensselaer			35	26			5	0			3	0					2	0			23	6			68	32
Rockland											2	1	4	4	3	0					9	1			18	6
St. Lawrence							4	4					27	5	5	0		1	1	1	37	4	3	0	74	15
Saratoga							13	4	7	1			12	1	16	1					44	4			92	11
Schenectady			62	9									1	0							4	1			67	10
Schoharie															9	0	1	0			16	2			26	2
Schuyler																			1	0	17	0			18	0
Seneca											8	0	16	0			1	0			22	5	5	0	47	5
Steuben							62	5					2	1	7	1					24	6			95	13
Suffolk											1	0	7	0					1	0	8	1	3	2	17	1
Sullivan															3	1			1	0	9	4			13	5
Tioga											10	4	2	0			1	0			8	1			21	5
Tompkins							40	5									4	1			6	0			50	6
Ulster					13	2							7	0	0	1	1	0			32	11			53	14
Warren							6	5													7	3			13	8
Washington											2	0	17	2	3	1					12	1			34	4
Wayne											2	0	2	1	3	0	2	0			16	4			25	5
Westchester			20	4	16	0	18	8			4	1	12	0	5	1			4	0	16	2			95	16
Wyoming													3	0	1	0					1	0			5	0
Yates																					10	0			10	0
Total	527	100	236	84	277	54	663	72	50	8	98	16	183	30	163	22	52	6	14	2	906	133			3,169	527
Total institutions																							43	17	43	17
Grand total																									3,212	544

Table 7

TYPHOID FEVER — CASES AND DEATHS IN COUNTIES GROUPED BY POPULATION, 1913

COUNTY	175,000 to 1,000,000		50,000 to 175,000		20,000 to 50,000		10,000 to 20,000		7,500 to 10,000		5,000 to 7,500		2,500 to 5,000		1,000 to 2,500		500 to 1,000		UNDER 500		TOWNS		INSTITUTIONS		TOTAL	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Albany			278	28	20	8	59	11					8	1			1	0			24	7			390	55
Allegany													14	0	3	2			1	0	15	5			33	7
Broome			49	8							15	2			2	0	1	0			4	1			71	11
Cattaraugus							14	4	9	2			1	0	1	1	8	0			15	3			48	10
Cayuga					16	5													2	0	12	3			30	8
Chautauqua					14	3	43	13			0	1			3	1	5	0			20	4			85	22
Chemung					48	4							5	0							9	1			62	5
Chenango									6	3					18	3					9	3			33	9
Clinton							22	6							1	0					24	4			47	10
Columbia							29	7							13	2	1	0			19	1			62	10
Cortland							23	2					1	0	1	0					13	1			38	3
Delaware													7	1	0	1	4	1			89	12			100	15
Dutchess					17	3	5	1							3	0	16	1			12	2	1	0	53	7
Erie	302	68					14	0	15	3	4	0	5	1	4	1	1	0			15	9	4	0	360	82
Essex													6	0	4	0					20	2			30	2
Franklin											11	5	2	0			1	1			19	3			33	9
Fulton					10	2	2	3							0	1					2	2			14	8
Genesee							15	2					3	3	2	0			2	1	13	3			35	9
Greene											36	5	28	2							16	0			80	7
Hamilton																					3	1			3	1
Herkimer							30	5	7	1			3	1							10	2			50	9
Jefferson					52	3							2	1	3	1	7	1			12	1			76	7
Lewis													2	0			1	1			9	5			12	6
Livingston															2	0					3	0	0	0	5	0
Madison									5	1			6	2	4	1			1	0	12	1			28	5
Monroe	121	23											1	0	4	0	1	1			30	5			157	29
Montgomery					27	3							2	2	1	1	2	0			5	2			37	8
Nassau											1	0			15	6					17	6			33	12
Niagara					21	10	265	15							4	2	1	0			19	4			256	31
Oneida			26	8	16	5									3	0	7	1	1	0	39	7	7	0	92	21
Onondaga			32	19							4	0	18	2	5	1	5	0			24	4	1	0	88	26
Ontario							5	5	17	1					3	0			4	0	10	4			39	10
Orange					24	8	30	6	3	2	62	4	11	1	2	1	1	0			23	4			156	26

| | | |

Table 8

COMMUNICABLE DISEASES REPORTED BY COUNTIES, 1917

COUNTY	Chickenpox	Diphtheria	Measles	German measles	Mumps	Scarlet fever	Smallpox	Tuberculosis			Typhoid fever	Whooping cough	Puerperal septicemia	Rabies	Poliomyelitis	Paratyphoid	Cerebrospinal meningitis	Septic sore throat	Ophthalmia neonatorum	Dysentery	Glanders	Trachoma	Typhus	Anthrax
								Pulmonary	Other forms	Total														
Albany	348	138	1,308	325	44	25	230	480	24	504	417	238	5	.....	6	.....	7	13	7	.....	.....	3	.....	.....
Allegany	180	23	338	4	125	42	.....	23	1	24	38	435	2	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....
Broome	157	524	1,241	78	16	506	1	127	1	128	24	651	7	.....	1	14	11	37	2	37	.....	1	.....	9
Cattaraugus	89	70	323	17	4	101	109	58	3	61	15	126	2	1	5	.....	1	3	.....	.....	.....	.....	.....	1
Cayuga	26	69	373	36	14	94	.....	30	2	32	19	33	.....	.....	2	.....	.....	8	1	.....	.....	.....	.....	.....
Chautauqua	710	185	668	324	67	184	21	107	1	108	57	620	11	.....	4	1	5	29	.....	.....	.....	.....	.....	.....
Chemung	162	93	245	12	1	75	.....	140	4	144	45	106	2	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....
Chenango	44	56	263	25	.....	46	.....	24	4	28	27	40	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Clinton	86	71	168	6	4	93	1	55	1	56	45	127	2	.....	6	.....	1	3	1	.....	.....	.....	.....	.....
Columbia	68	21	149	36	14	67	.....	95	6	101	32	125	.....	.....	8	.....	1	.....	1	33	.....	.....	.....	.....
Cortland	123	5	1,013	10	2	38	.....	36	7	43	16	9	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Delaware	45	24	439	70	2	30	.....	40	3	43	16	105	1	.....	2	.....	1	2	.....	30	.....	.....	.....	.....
Dutchess	162	115	245	127	142	124	8	295	13	308	58	308	1	.....	1	.....	6	2	5	349	.....	.....	.....	.....
Erie	1,576	1,300	1,169	485	494	770	49	1,820	135	1,955	315	2,304	3	.....	9	.....	63	36	23	.....	.....	2	.....	1
Essex	58	33	298	15	21	39	.....	104	8	112	41	66	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....
Franklin	79	62	452	1	9	34	.....	1,265	25	1,290	29	70	2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fulton	76	74	171	18	3	32	3	79	5	84	7	108	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	1
Genesee	125	26	97	17	97	107	1	34	2	36	31	38	1	.....	5	1	1	6	.....	.....	.....	.....	.....	.....
Greene	26	8	103	33	.....	16	.....	55	7	62	39	41	.....	.....	5	.....	4	1	.....	.....	.....	.....	.....	.....
Hamilton	.....	1	6	.....	1	2	.....	3	1	4	4	93	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Herkimer	135	49	872	72	60	38	51	123	15	138	28	273	3	.....	.....	.....	.....	5	1	.....	.....	.....	.....	.....
Jefferson	260	20	1,526	156	69	96	.....	116	5	121	75	544	1	.....	6	.....	.....	8	3	.....	.....	.....	.....	.....
Lewis	19	11	52	14	.....	14	.....	17	1	18	7	13	.....	.....	1	.....	1	.....	.....	1	.....	.....	.....	.....
Livingston	86	8	312	10	3	43	.....	55	10	65	5	86	2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Madison	95	15	328	64	1	72	.....	37	6	43	7	86	.....	.....	.....	.....	1	3	.....	.....	.....	.....	.....	.....
Monroe	321	486	2,580	41	60	2,733	.....	830	2	832	92	414	2	.....	5	.....	7	1	13	1	.....	3	.....	.....
Montgomery	84	37	459	76	17	13	2	152	6	158	12	43	.....	.....	1	.....	3	8	.....	1	.....	.....	.....	.....
Nassau	164	165	400	518	47	122	1	97	15	112	15	106	4	.....	2	.....	1	1	1	.....	.....	.....	.....	.....
Niagara	516	132	555	585	40	92	16	174	10	184	97	377	1	.....	4	1	7	1	2	.....	.....	.....	.....	.....
Oneida	234	118	1,237	99	15	160	30	205	13	218	127	233	1	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....
Onondaga	86	497	1,911	6	10	1,057	1	308	7	315	75	44	.....	.....	4	.....	5	.....	1	.....	.....	.....	.....	.....
Ontario	115	13	80	28	5	60	9	60	7	67	49	81	.....	.....	.....	2	.....	2	.....	.....	.....	.....	.....	.....

Orange	269	167	1,311	113	110	140	.....	196	15	211	32	156	.....	.....	6	1	1	4	.....	2	.....	.....	.....	.....
Orleans	38	8	179	2	.....	64	.....	29	3	32	15	1	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....
Oswego	80	62	502	2	30	127	.....	87	2	89	29	135	.....	.....	1	.....	2	.....	1	.....	.....	.....	.....	1
Otsego	59	20	317	83	46	37	.....	18	5	23	28	232	4	.....	3	.....	.....	30	.....	.....	.....	.....	.....	.....
Putnam	21	39	77	29	38	44	.....	20	2	22	2	89	.....	.....	.....	.....	.....	5	.....	.....	.....	.....	.....	.....
Rensselaer	63	154	1,454	139	28	254	.....	250	4	254	123	316	.....	.....	7	1	4	3	3	.....	.....	.....	.....	.....
Rockland	124	68	148	106	68	57	.....	93	13	106	16	41	2	.....	.....	.....	2	1	1	.....	.....	.....	.....	.....
St. Lawrence	83	80	406	11	12	26	2	108	20	128	83	255	5	.....	38	1	1	.....	3	.....	.....	.....	.....	.....
Saratoga	176	120	357	126	4	36	.....	88	8	96	76	65	.....	.....	2	.....	1	1	1	.....	.....	1	.....	.....
Schenectady	317	105	2,158	94	83	123	.....	183	4	187	48	247	1	.....	3	.....	5	1	.....	.....	.....	.....	.....	.....
Schoharie	30	6	123	10	3	19	.....	33	1	34	10	117	.....	.....	.....	1	.....	2	.....	.....	.....	.....	.....	.....
Schuyler	35	2	110	30	2	27	.....	10	1	11	7	89	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Seneca	75	18	184	64	6	28	.....	125	5	130	15	9	.....	.....	.....	.....	1	2	1	.....	.....	.....	.....	.....
Steuben	229	229	1,069	23	190	57	2	53	10	63	49	423	3	.....	.....	.....	5	2	1	.....	.....	.....	.....	.....
Suffolk	143	106	928	109	20	89	.....	302	15	317	130	198	2	.....	1	.....	1	2	.....	9	.....	.....	.....	.....
Sullivan	24	12	441	26	6	21	.....	1,162	67	1,229	15	168	3	.....	1	.....	.....	2	.....	1	.....	.....	.....	.....
Tioga	26	36	336	7	.....	37	1	19	2	21	16	58	.....	.....	1	.....	.....	3	.....	.....	.....	.....	.....	1
Tompkins	84	7	148	97	1	14	.....	78	7	85	23	85	.....	.....	3	1	.....	1	.....	.....	.....	.....	.....	.....
Ulster	197	43	194	48	67	55	.....	125	2	127	68	122	.....	.....	1	.....	1	3	1	1	.....	.....	.....	.....
Warren	5	59	207	7	1	66	.....	57	7	64	20	82	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....
Washington	52	101	298	10	11	126	15	49	1	50	26	128	1	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Wayne	149	22	765	46	87	117	.....	72	18	90	43	397	1	.....	3	.....	1	2	.....	12	.....	1	.....	.....
Westchester	1,151	626	2,137	1,166	537	459	1	430	37	467	87	1,223	9	.....	2	5	5	13	.....	1	.....	6	.....	.....
Wyoming	56	8	92	12	11	18	.....	24	5	29	2	85	1	.....	.....	.....	.....	1	1	1	.....	.....	.....	.....
Yates	8	12	19	2	3	3	.....	11	2	13	24	94	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
Total	9,749	6,559	33,341	5,670	2,751	9,174	348	10,666	606	11,272	2,851	12,758	87	1	156	29	162	249	77	479	.....	18	.....	14
New York City	8,548	12,624	27,519	8,556	4,101	6,060	14	17,414	.....	17,414	1,442	5,597	.....	1	139	.....	322	.....	.....	.....	2	.....	13	18
Grand total	18,297	19,183	60,860	14,226	6,852	15,234	362	28,080	606	28,686	4,293	18,355	87	2	295	29	484	249	77	479	2	18	13	32

Table 9

COMMUNICABLE DISEASE CASE RATES PER 100,000 POPULATION, BY COUNTIES, 1917

COUNTY	Chickenpox	Diphtheria	Measles	German measles	Mumps	Scarlet fever	Smallpox	Tuberculosis			Typhoid fever	Whooping cough	Puerperal septicemia	Poliomyelitis	Cerebrospinal meningitis	Septic sore throat	Ophthalmia neonatorum
								Pulmonary	Other forms	Total							
Albany	186	73.7	699	174	23.5	123	13.4	256	12.8	269	223	127	2.7	3.2	3.7	6.9	3.7
Allegany	452	58	848	10	314	105	.....	58	2.5	60	95	1,092	.....	.....	.....	.....	.....
Broome	165	550	1,303	82	17	581	1	133	1	134	25	684	.....	1	11.5	.....	.....
Cattaraugus	117	92	426	22	5	133	144	76	4	80	20	166	.....	6.6	.....	.....	.....
Cayuga	40	105	571	55	21	144	.....	46	3	49	29	50	.....	3.1	.....	.....	.....
Chautauqua	585	152	550	267	55	151	17	88	1	89	47	511	.....	3.3	4.1	.....	.....
Chemung	267	153	404	19	.....	123	.....	231	6	237	74	174	.....	.....	.....	.....	.....
Chenango	118	151	707	67	.....	124	.....	64	11	75	73	108	.....	.....	.....	.....	.....
Clinton	181	150	354	13	8	196	2	116	2	118	95	268	.....	12.7	2	.....	.....
Columbia	153	47	336	81	31	151	.....	214	13	227	72	282	.....	18	.....	.....	.....
Cortland	405	16	3,333	33	7	125	.....	118	23	141	53	30	.....	.....	.....	.....	.....
Delaware	97	52	948	151	4	65	.....	86	6	93	35	227	.....	4.3	.....	.....	.....
Dutchess	175	124	265	137	153	134	9	319	14	333	63	333	.....	10	7	.....	.....
Erie	268	221	199	82	84	131	8	309	23	332	54	392	.....	1.5	11	.....	.....
Essex	181	103	930	47	65	122	.....	324	25	349	128	206	.....	.....	.....	.....	.....
Franklin	170	134	974	2	19	73	.....	2,726	54	2,780	62	151	.....	2	.....	.....	.....
Fulton	165	161	371	39	6	69	6	171	11	182	15	234	.....	4	.....	.....	.....
Genesee	298	62	231	40	231	255	.....	81	5	86	74	91	.....	.....	.....	.....	.....
Greene	86	27	343	110	.....	53	.....	183	23	206	130	136	.....	.....	.....	.....	.....
Hamilton	.....	22	132	.....	22	44	.....	66	22	88	88	2,046	.....	.....	.....	.....	.....
Herkimer	201	73	1,299	107	89	56	75	183	22	205	41	406	.....	.....	.....	.....	.....
Jefferson	320	25	1,877	192	85	118	.....	143	6	149	92	669	.....	7.3	.....	.....	.....
Lewis	72	41	197	53	.....	53	.....	64	4	68	26	49	.....	3.8	3.8	.....	.....
Livingston	223	21	808	26	8	111	.....	142	26	168	13	223	.....	2.6	.....	.....	.....
Madison	222	35	767	150	2	168	.....	87	14	101	16	201	.....	.....	.....	.....	.....
Monroe	96	146	774	12	18	820	.....	250	1	251	28	124	.....	1.5	2.1	.....	.....
Montgomery	135	56	736	122	27	21	3	244	9	253	19	69	.....	1.6	4.8	.....	.....
Nassau	126	127	308	399	36	94	1	74	11	86	11	81	.....	1.4	.7	.....	.....
Niagara	448	115	482	598	35	89	14	151	9	160	84	319	.....	3.5	6.1	.....	.....
Oneida	136	68	717	57	9	93	17	119	7	126	74	135	.....	.....	.6	.....	.....
Onondaga	39	226	871	3	4	485	.5	143	3	146	37	23	.....	1.8	2.3	.....	.....
Ontario	207	23	144	50	9	108	16	108	12	120	88	145	.....	.....	.....	.....	.....

Orange	226	140	1,102	95	92	118	.....	165	12	177	27	131	.....	5	.8	.....	.....
Orleans	109	23	515	6	.....	184	.....	83	9	92	43	3	.....	2.9	.....	.....	.....
Oswego	103	80	647	2	39	164	.....	112	3	115	37	174	.....	.....	.....	.....	.....
Otsego	120	41	647	169	94	75	.....	37	10	47	57	473	.....	6.1	.....	.....	.....
Putnam	175	325	641	242	316	366	.....	167	16	183	17	741	.....	.....	.....	.....	.....
Rensselaer	52	127	1,202	115	23	210	.....	207	3	210	102	261	.....	5.8	3.3	.....	.....
Rockland	264	144	315	226	144	121	.....	198	28	226	34	87	.....	.....	4.2	.....	.....
St. Lawrence	91	88	447	12	13	29	2	119	22	141	91	280	.....	41.8	.....	.....	.....
Saratoga	278	189	564	199	6	57	.....	139	12	151	120	102	.....	3.2	1.6	.....	.....
Schenectady	309	102	2,106	91	81	120	.....	178	4	182	47	241	.....	2.9	4.8	.....	.....
Schoharie	132	26	542	44	13	83	.....	145	4	149	44	516	.....	.....	.....	.....	.....
Schuyler	251	14	788	215	14	193	.....	72	7	79	50	638	.....	7.2	.....	.....	.....
Seneca	305	73	749	260	24	114	.....	509	20	529	61	37	.....	.....	4.1	.....	.....
Steuben	272	272	1,272	27	226	68	2	63	12	75	58	503	.....	.....	6	.....	.....
Suffolk	133	99	863	101	19	82	.....	281	14	295	121	184	.....	.9	.9	.....	.....
Sullivan	60	30	1,102	65	15	67	.....	2,920	167	3,087	37	420	.....	2.5	.....	.....	.....
Tioga	102	141	1,315	27	.....	145	4	74	8	82	63	227	.....	3.9	.....	.....	.....
Tompkins	223	19	392	257	3	37	.....	207	18	225	61	225	.....	7.9	.....	.....	.....
Ulster	238	52	234	58	81	66	.....	151	3	154	82	147	.....	1.2	1.2	.....	.....
Warren	15	177	622	21	3	198	.....	171	21	192	60	246	.....	.....	.....	.....	.....
Washington	111	217	639	21	23	270	32	105	2	107	56	274	.....	2.1	2.1	.....	.....
Wayne	272	40	1,396	84	159	213	.....	131	33	164	78	724	.....	5.5	1.8	.....	.....
Westchester	342	186	635	346	159	136	0.3	128	11	139	26	363	.....	5.6	1.5	.....	.....
Wyoming	167	24	275	36	33	54	.....	72	15	87	6	254	.....	.....	.....	.....	.....
Yates	42	63	100	10	16	16	.....	58	10	68	127	496	.....	.....	.....	.....	.....
Total	205	138	701	119	59	193	7	224	13	237	60	268	.....	3.3	3.4	.....	.....
New York City	149	220	479	149	71	105	0.2	303	.....	303	25	97	.....	2.4	5.6	.....	.....
Grand total	174	183	580	136	65	145	3	268	.....	273	41	175	.....	2.8	4.6	.....	.....

Table 10

COMMUNICABLE DISEASES REPORTED BY MONTHS UP-STATE, NEW YORK CITY AND ENTIRE STATE, 1917

MONTH	Chickenpox	Diphtheria	Measles	German measles	Mumps	Scarlet fever	Smallpox	Tuberculosis: Pulmonary	Tuberculosis: Other forms	Tuberculosis: Total	Typhoid fever	Whooping cough	Puerperal septicæmia	Rabies	Poliomyelitis	Paratyphoid	Cerebrospinal meningitis	Septic sore throat	Ophthalmia neonatorum	Dysentery	Glanders	Trachoma	Typhus	Anthrax
Up-state																								
January	1,158	635	2,492	39	226	872	1	923	63	986	178	676	22	.....	4	2	7	39	6	1	....	3	....	1
February	904	521	3,136	63	195	1,049	1	959	68	1,027	210	790	13	.....	3	1	10	45	9	.....	....	1	....	.....
March	870	556	3,988	353	275	1,615	3	952	63	1,015	212	860	12	.....	11	1	14	22	5	4	....	1	....	1
April	861	458	4,817	891	303	1,651	11	967	56	1,023	150	1,164	9	1	14	2	17	24	6	3	....	5	....	1
May	1,089	444	5,976	1,904	402	873	32	992	63	1,055	119	1,248	5	.....	7	1	19	16	4	3	....	2	....	1
June	881	384	5,208	1,634	251	564	25	992	64	1,056	143	1,163	8	.....	9	2	22	9	7	2	....	1	....	1
July	303	369	2,244	259	115	308	17	944	62	1,006	232	1,565	.....	.....	20	11	10	14	6	51	....	1	....	2
August	64	350	474	36	39	171	4	910	44	954	373	1,025	1	.....	40	3	9	9	10	270	....	1	.....	.....
September	106	516	311	24	53	258	24	786	34	820	502	833	4	.....	30	2	9	9	6	108	.....	.....	....	2
October	649	880	656	56	129	465	97	862	29	891	363	1,147	1	.....	9	2	7	6	7	30	.....	.....	.....	.....
November	1,440	798	1,384	99	284	667	28	727	30	757	220	1,223	4	.....	7	.....	22	38	6	3	....	2	....	4
December	1,424	648	2,655	312	479	681	105	652	30	682	149	1,064	8	.....	2	2	16	18	5	4	....	1	....	1
Total	9,749	6,559	33,341	5,670	2,751	9,174	348	10,666	606	11,272	2,851	12,758	87	1	156	29	162	249	77	479	....	18	....	14
New York City																								
January	874	1,109	899	108	306	578	1	2,011	.....	2,011	79	122	.....	.....	12	.....	24	.....	....	....	....	....	1	1
February	876	1,194	1,871	285	358	657	3	1,292	.....	1,292	98	153	.....	.....	4	.....	31	.....	....	....	....	....	.....	2
March	1,294	1,211	3,914	1,085	610	622	1	2,000	.....	2,000	43	177	.....	.....	7	.....	38	.....	....	....	....	....	3	.....
April	957	1,132	4,634	1,468	518	775	2	1,174	.....	1,174	61	285	.....	.....	4	.....	38	.....	....	....	....	....	.....	2
May	1,212	1,267	5,736	2,860	640	872	1	1,266	.....	1,266	106	418	.....	.....	10	.....	60	.....	....	....	1	....	1	4
June	1,183	1,198	4,355	2,279	574	515	3	1,310	.....	1,310	84	511	.....	.....	3	.....	37	.....	....	....	....	....	.....	1
July	217	934	1,368	162	169	267	.....	1,469	.....	1,469	93	771	.....	.....	24	.....	24	.....	....	....	....	....	2	.....
August	78	660	480	33	88	105	.....	1,804	.....	1,804	185	1,018	.....	.....	19	.....	13	.....	....	....	....	....	1	2
September	64	680	214	28	150	178	.....	1,119	.....	1,119	365	566	.....	.....	9	.....	19	.....	....	....	....	....	.....	1
October	303	1,086	362	41	116	345	.....	1,491	.....	1,491	178	435	.....	1	6	.....	10	.....	....	....	....	....	3	1
November	584	1,091	870	68	214	527	.....	1,385	.....	1,385	87	577	.....	.....	8	.....	13	.....	....	....	1	....	1	4
December	906	1,062	2,816	139	358	619	3	1,093	.....	1,093	63	564	.....	.....	4	.....	15	.....	....	....	....	....	1	.....
Total	8,548	12,624	27,519	8,556	4,101	6,060	14	17,414	.....	17,414	1,442	5,597	.....	1	139	.....	322	.....	....	....	2	....	13	18

Entire State

January	2,032	1,744	3,391	147	532	1,450	2	2,934	63	2,997	257	798	22	.....	16	2	31	39	6	1	....	3	1	2
February	1,780	1,715	5,007	348	553	1,706	4	2,251	68	2,319	308	943	13	.....	7	1	41	45	9	....	....	1	....	2
March	2,164	1,767	7,992	1,438	885	2,237	4	2,952	63	3,015	255	1,037	12	.....	18	1	52	22	5	4	....	1	3	1
April	1,818	1,590	9,451	2,359	821	2,426	13	2,141	56	2,197	211	1,449	9	1	18	2	55	24	6	3	....	5	....	3
May	2,301	1,711	11,712	4,764	1,042	1,745	33	2,258	63	2,321	225	1,666	5	.....	17	1	79	16	4	3	1	2	1	5
June	2,064	1,582	9,563	3,913	825	1,079	28	2,302	64	2,366	227	1,674	8	.....	41	2	59	9	7	2	....	1	....	2
July	520	1,393	3,612	421	284	575	17	2,413	62	2,475	325	2,336	.....	.....	44	11	34	14	6	51	....	1	2	2
August	142	1,010	954	69	127	276	4	2,714	44	2,758	558	2,043	1	.....	59	3	22	9	10	270	....	1	1	2
September	179	1,196	525	52	203	436	24	1,905	34	1,939	867	1,399	4	.....	39	2	28	9	6	108	....	....	....	3
October	952	1,966	1,018	97	245	810	97	2,353	29	2,382	541	1,582	1	1	15	2	17	6	7	30	....	....	3	1
November	2,024	1,889	2,254	167	498	1,194	28	2,112	30	2,142	307	1,800	4	.....	15	.....	35	38	6	3	1	2	1	8
December	2,330	1,710	5,471	451	837	1,300	108	1,745	30	1,775	212	1,628	8	.....	6	2	31	18	5	4	....	1	1	1
Total	18,297	19,183	60,860	14,226	6,852	15,234	362	28,080	606	28,686	4,293	18,355	87	2	295	29	484	249	77	479	2	18	13	32

Table 11

ACCUMULATIVE TOTALS OF DISEASES REPORTED UP-STATE BY MONTHS, 1917

MONTH	Chickenpox	Diphtheria	Measles	German measles	Mumps	Scarlet fever	Smallpox	Tuberculosis			Typhoid fever	Whooping cough	Puerperal septicemia	Rabies	Poliomyelitis	Paratyphoid	Cerebrospinal meningitis	Septic sore throat	Ophthalmia neonatorum	Dysentery	Trachoma	Anthrax
								Pulmonary	Other forms	Total												
January	1,158	635	2,492	39	220	872	1	923	63	986	178	676	22	.....	4	2	7	39	6	1	3	1
February	904	521	3,136	63	195	1,049	1	959	68	1,027	210	790	13	.....	3	1	16	45	9	.....	1	.....
March	2,062	1,156	5,628	102	421	1,921	2	1,882	131	2,012	388	1,466	35	.....	7	3	17	84	15	1	4	1
	876	556	3,988	353	275	1,615	3	952	63	1,015	212	860	12	.....	11	1	14	22	5	4	1	1
April	2,932	1,712	9,616	455	696	3,536	5	2,834	194	3,028	600	2,326	47	.....	18	4	31	106	20	5	5	2
	861	458	4,817	891	303	1,651	11	967	56	1,023	159	1,164	9	1	14	2	17	24	6	3	5	1
May	3,793	2,170	14,433	1,346	999	5,187	16	3,801	250	4,051	750	3,490	56	1	32	6	48	130	26	8	10	3
	1,089	444	5,976	1,904	402	873	32	992	63	1,055	119	1,248	5	.....	7	1	19	16	4	3	2	1
June	4,882	2,614	20,409	3,250	1,401	6,060	48	4,793	313	5,106	869	4,738	61	1	39	7	67	146	30	11	12	4
	881	384	5,268	1,634	251	564	25	992	64	1,056	143	1,163	8	.....	9	2	22	9	7	2	1	1
July	5,763	2,998	25,617	4,884	1,652	6,624	73	5,785	377	6,162	1,012	5,901	69	1	48	9	89	155	37	13	13	5
	363	369	2,244	259	115	308	17	944	62	1,006	232	1,565	.....	.....	26	11	10	14	6	51	1	2
August	6,666	3,367	27,861	5,143	1,767	6,932	90	6,729	439	7,168	1,244	7,466	69	1	68	20	99	169	43	64	14	7
	64	350	474	36	39	171	4	910	44	954	373	1,025	1	.....	40	3	9	9	10	270	1	.....
September	6,130	3,717	28,335	5,179	1,806	7,102	94	7,639	483	8,122	1,617	8,491	70	1	108	23	108	178	53	334	15	7
	106	516	311	24	53	258	24	786	34	826	502	833	4	.....	30	2	9	9	6	108	.....	2

October	6,236 649	4,233 880	28,646 656	5,203 56	1,859 129	7,301 465	118 97	8,425 862	517 29	8,942 891	2,119 363	9,324 1,147	74 1	1	138 9	25 2	117 7	187 6	59 7	442 30	15	9
	6,885 1,440	5,113 708	29,302 1,384	5,259 99	1,988 284	7,826 607	215 28	9,287 727	546 30	9,833 757	2,482 226	10,471 1,223	75 4	1	147 7	27	124 2	193 38	66 6	472 3	15 2	9 4
November	8,325 1,424	5,911 645	30,686 2,655	5,358 312	2,272 470	8,493 681	243 105	10,014 652	576 30	10,596 682	2,708 140	11,694 1,064	79 8	1	154 2	27 2	149 16	231 15	72 2	477 4	17 1	13 1
December	9,749	6,556	33,341	5,670	2,751	9,174	348	10,666	606	11,272	2,851	12,758	87	1	156	29	165	240	77	479	18	14

Table 12

REPORTED CASES, DEATHS, CASE RATE, CASE FATALITY RATE AND DEATH RATE PER 100,000 POPULATION, FOR CERTAIN COMMUNICABLE DISEASES BY COUNTIES, 1917

COUNTIES	TYPHOID FEVER					MEASLES					SCARLET FEVER					WHOOPING COUGH					DIPHTHERIA				
	Cases	Deaths	Case rate	Case fatality rate	Death rate	Cases	Deaths	Case rate	Case fatality rate	Death rate	Cases	Deaths	Case rate	Case fatality rate	Death rate	Cases	Deaths	Case rate	Case fatality rate	Death rate	Cases	Deaths	Case rate	Case fatality rate	Death rate
Albany	417	22	223	.052	12	1,308	35	699	.026	19	230	.....	123	.....	.....	238	9	127	.037	5	138	15	73.7	.108	8
Allegany	38	4	95	.105	10	338	1	848	.002	3	42	.....	105	.....	.....	435	2	1,092	.004	5	23	1	58	.043	3
Broome	24	8	25	.333	8	1,241	13	1,303	.009	12	506	7	531	.013	7	651	20	684	.03	21	524	41	550	.078	43
Cattaraugus	15	2	20	.133	3	323	4	426	.012	5	101	.....	133	.....	.....	126	3	166	.023	4	70	7	92	.1	9
Cayuga	19	3	29	.156	5	373	2	571	.005	3	94	.....	144	.....	.....	33	1	50	.03	2	69	9	105	.13	14
Chautauqua	57	5	47	.087	4	668	5	550	.007	4	184	4	151	.021	3	620	19	511	.03	16	185	5	152	.027	4
Chemung	45	5	74	.111	8	245	.....	404	.....	.....	75	3	123	.04	5	106	2	174	.018	3	93	3	153	.032	5
Chenango	27	3	73	.111	8	263	.....	707	.....	.....	46	.....	124	.....	.....	40	.....	108	.....	.....	56	.....	151	.....	.....
Clinton	45	9	95	.2	19	168	1	354	.005	2	93	1	196	.01	2	127	9	268	.07	19	71	12	150	.169	25
Columbia	32	4	72	.125	9	149	1	336	.006	2	67	1	151	.014	2	125	3	282	.024	7	21	.....	47	.....	.....
Cortland	16	1	53	.062	3	1,013	1	3,333	.0009	3	38	4	125	.105	13	9	.....	30	.....	.....	5	1	16	.2	3
Delaware	16	6	35	.375	13	439	1	948	.002	2	30	.....	65	.....	.....	105	5	227	.047	11	24	1	52	.041	2
Dutchess	58	5	63	.086	5	245	.....	265	.....	.....	124	3	134	.024	3	308	10	333	.032	11	115	9	124	.078	10
Erie	315	56	54	.177	10	1,169	60	199	.051	10	770	32	131	.041	5	2,304	82	392	.035	14	1,306	125	221	.096	21
Essex	41	4	128	.097	12	298	.....	930	.....	.....	39	.....	122	.....	.....	66	1	206	.015	3	33	1	103	.03	3
Franklin	29	8	62	.275	17	452	3	974	.006	6	34	1	73	.029	2	70	7	151	.1	15	62	7	134	.112	15
Fulton	7	1	15	.142	2	171	.....	371	.....	.....	32	.....	69	.....	.....	108	6	234	.055	13	74	7	161	.094	15
Genesee	31	3	74	.096	7	97	2	231	.02	5	107	.....	255	.....	.....	38	1	91	.026	2	26	2	62	.076	5
Greene	39	3	130	.074	10	103	.....	343	.....	.....	16	.....	53	.....	.....	41	3	136	.073	10	8	1	27	.125	3
Hamilton	4	.....	88	.....	.....	6	.....	132	.....	.....	2	.....	44	.....	.....	93	.....	2,046	.....	.....	1	1	22	1.	22
Herkimer	28	4	41	.142	6	872	7	1,299	.008	10	38	1	56	.026	1	273	4	406	.014	6	49	6	73	.122	9
Jefferson	75	5	92	.066	6	1,526	2	1,877	.001	2	96	.....	118	.....	.....	544	24	669	.044	30	20	4	25	.2	5
Lewis	7	3	26	.428	11	52	2	197	.038	8	14	1	53	.071	4	13	2	49	.153	8	11	.....	41	.....	.....
Livingston	5	1	13	.2	3	312	3	808	.009	8	43	.....	111	.....	.....	86	2	223	.023	5	8	.....	21	.....	.....
Madison	7	2	16	.285	5	328	1	767	.003	2	72	.....	168	.....	.....	86	1	201	.011	2	15	4	35	.266	9
Monroe	92	9	28	.097	3	2,580	39	774	.015	12	2,733	39	820	.014	12	414	20	124	.048	6	486	59	146	.121	18
Montgomery	12	1	19	.083	2	459	2	736	.004	3	13	.....	21	.....	.....	43	1	69	.023	2	37	5	56	.135	8
Nassau	15	1	11	.066	1	400	10	308	.025	8	122	1	94	.008	1	106	8	81	.075	6	165	17	127	.103	13
Niagara	97	15	84	.154	13	555	7	482	.012	6	92	2	80	.021	2	377	11	319	.029	10	132	6	115	.045	5

Oneida	127	18	74	.141	10	1,237	29	717	.023	17	160	1	93	.006	1	233	15	135	.064	9	118	19	68	.161	11
Onondaga	75	17	37	.226	8	1,911	22	871	.011	10	1,057	14	485	.013	6	44	11	23	.25	5	497	42	226	.084	19
Ontario	49	4	88	.081	7	80	.....	144	.....	.....	60	1	108	.016	2	81	1	145	.012	2	13	1	23	.076	2
Orange	32	6	27	.187	5	1,311	5	1,102	.003	4	140	2	118	.014	2	156	6	131	.038	5	167	14	140	.083	12
Orleans	15	1	43	.066	3	179	1	515	.005	3	64	.....	184	.....	.....	1	1	3	1.	3	8	1	23	.125	3
Oswego	29	1	37	.034	1	502	2	647	.003	3	127	.....	164	.....	.....	135	8	174	.059	10	62	7	80	.112	9
Otsego	28	4	57	.142	8	317	1	647	.003	2	37	.....	75	.....	.....	232	3	473	.012	6	20	.....	41	.....	.....
Putnam	2	.....	17	.....	.....	77	.....	641	.....	.....	44	.....	366	.....	.....	89	1	741	.011	8	39	1	325	.025	8
Rensselaer	123	23	102	.186	19	1,454	15	1,202	.01	12	254	3	210	.011	2	316	22	261	.069	18	154	20	127	.129	16
Rockland	16	6	34	.375	13	148	5	315	.033	11	57	1	121	.017	2	41	3	87	.073	6	68	8	144	.117	17
St. Lawrence	83	10	91	.12	11	406	8	447	.019	9	26	1	29	.038	1	255	7	280	.027	8	80	6	88	.075	6
Saratoga	76	10	120	.131	16	357	1	564	.002	2	36	.....	57	.....	.....	65	1	102	.015	2	120	7	189	.058	11
Schenectady	48	5	47	.104	5	2,158	10	2,106	.004	9	123	2	120	.016	2	247	5	241	.02	5	105	8	102	.076	8
Schoharie	10	1	44	.1	4	123	.....	542	.....	.....	19	.....	83	.....	.....	117	1	516	.008	4	6	.....	26	.....	.....
Schuyler	7	1	50	.142	7	110	.....	788	.....	.....	27	.....	193	.....	.....	89	2	638	.022	14	2	.....	14	.....	.....
Seneca	15	3	61	.2	12	184	.....	749	.....	.....	28	.....	114	.....	.....	9	.....	37	.....	.....	18	3	73	.166	12
Steuben	49	6	58	.122	7	1,069	1	1,272	.0009	1	57	2	68	.035	2	423	7	503	.016	8	229	16	272	.069	19
Suffolk	130	9	121	.069	8	928	7	863	.007	7	89	1	82	.011	1	198	5	184	.025	5	106	13	99	.122	12
Sullivan	15	2	37	.133	5	441	.....	1,102	.....	.....	21	1	67	.047	3	168	2	420	.011	5	12	.....	30	.....	.....
Tioga	16	5	63	.312	20	336	5	1,315	.014	20	37	1	145	.027	4	58	2	227	.034	8	36	7	141	.194	27
Tompkins	23	5	61	.217	13	148	1	392	.006	3	14	.....	37	.....	.....	85	1	225	.011	3	7	.....	19	.....	.....
Ulster	68	9	82	.132	11	194	2	234	.01	2	55	.....	66	.....	.....	122	7	147	.057	8	43	5	52	.116	6
Warren	20	3	60	.15	9	207	.....	622	.....	.....	66	1	198	.015	3	82	1	246	.012	3	59	5	177	.084	15
Washington	26	4	56	.153	9	298	3	639	.01	6	126	.....	270	.....	.....	128	1	274	.007	2	101	6	217	.059	13
Wayne	43	2	78	.046	4	765	5	1,396	.006	9	117	.....	213	.....	.....	397	5	724	.012	9	22	1	40	.045	2
Westchester	87	16	26	.183	5	2,137	9	635	.004	3	459	7	136	.015	2	1,223	22	363	.017	7	626	48	186	.076	14
Wyoming	2	.....	6	.....	.....	92	.....	275	.....	.....	18	.....	54	.....	.....	85	.....	254	.....	.....	8	2	24	.25	6
Yates	24	.....	127	.....	.....	19	.....	100	.....	.....	3	.....	16	.....	.....	94	1	496	.01	5	12	2	63	.166	11
Up-States	2851	361	60	12.66	7.6	33341	335	709	1	7.0	9174	139	193	1.51	2.9	12758	401	268	3.14	8.4	6559	589	138	8.98	12.4
New York City	1442	229	25	15.88	4	27519	557	479	2.02	9.7	6060	122	105	2.01	2.1	5597	485	97	8.66	8.4	12624	1156	220	9.15	20.1
Grand total	4293	590	41	13.74	5.6	60860	892	578	1.46	8.5	15234	261	145	1.71	2.5	18355	886	174	4.82	8.4	19183	1745	182	9.09	16.6

Table 13

FIVE YEAR AVERAGE OF CASES AND RATES OF IMPORTANT COMMUNICABLE DISEASES BY COUNTIES, 1917

COUNTY	SCARLET FEVER		MEASLES		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Albany	309.0	166.86	959.6	518.18	158.6	85.64	234.4	72.58	471.2	254.45
Allegany	36.4	90.27	382.0	947.36	166.8	413.66	14.0	34.72	21.2	52.58
Broome	192.4	211.64	876.4	964.04	239.6	263.56	322.0	354.20	126.4	139.04
Cattaraugus	71.6	100.96	445.0	627.45	99.0	139.59	47.2	66.55	60.8	85.73
Cayuga	143.8	218.58	509.8	774.90	117.4	178.44	61.2	93.02	89.8	136.50
Chautauqua	162.8	138.38	1,365.8	1,160.93	416.4	353.94	106.6	90.61	108.2	91.97
Chemung	57.8	97.68	553.6	935.58	69.2	116.95	102.8	173.05	148.0	250.12
Chenango	37.6	102.27	242.2	386.78	54.8	149.06	35.0	95.20	24.4	66.37
Clinton	48.6	102.06	320.4	672.84	97.8	205.38	42.2	88.62	104.6	219.66
Columbia	49.8	112.55	161.8	366.67	88.4	197.78	44.4	100.34	68.4	154.58
Cortland	33.0	108.90	300.6	991.98	71.2	235.62	26.6	87.78	27.2	89.76
Delaware	42.2	91.57	420.2	911.83	94.0	203.98	31.2	67.70	28.4	61.63
Dutchess	188.6	205.57	433.8	472.84	123.6	134.72	84.8	92.43	285.2	310.87
Erie	741.2	126.00	3,795.0	645.00	1,721.4	292.64	862.6	146.64	1,629.6	277.03
Essex	27.2	83.78	179.6	553.17	73.0	224.84	26.0	80.08	341.4	1,051.51
Franklin	43.2	95.47	433.0	956.93	38.2	84.42	71.0	156.91	1,319.2	2,915.43
Fulton	26.8	58.69	335.2	734.08	90.4	197.98	46.4	101.62	55.6	121.76
Genesee	53.2	131.94	226.2	560.98	83.8	207.82	29.6	73.41	31.8	78.86
Greene	27.6	91.63	145.4	482.73	42.8	142.09	19.8	65.74	35.4	117.53
Hamilton	4.8	106.85	20.0	445.20	22.0	489.72	0.4	8.90	7.8	173.63
Herkimer	149.6	231.88	696.4	1,079.42	127.6	197.78	93.6	145.08	90.0	139.50
Jefferson	50.0	61.50	870.2	1,070.35	218.0	268.14	44.2	54.37	61.2	75.28
Lewis	31.0	119.35	175.6	676.06	18.4	70.84	12.0	46.20	15.0	57.75
Livingston	51.4	128.50	286.8	717.00	98.2	245.50	19.8	49.50	77.2	193.00
Madison	44.0	105.16	239.8	573.12	71.0	169.69	16.2	38.71	21.8	52.10
Monroe	910.6	282.29	1,675.8	519.50	387.0	119.97	356.0	110.35	717.8	222.52
Montgomery	88.8	144.74	365.2	595.28	129.2	210.60	57.4	93.56	151.0	246.13
Nassau	159.8	135.83	400.8	340.68	92.8	78.88	193.2	164.22	89.4	75.99
Niagara	125.0	115.00	1,407.4	1,294.81	255.2	234.78	146.0	134.32	128.6	118.31
Oneida	262.8	155.05	1,355.2	799.57	157.2	92.74	157.2	92.75	253.6	149.62
Onondaga	430.0	197.80	1,778.6	818.16	101.2	46.55	359.6	165.41	276.2	127.05
Ontario	39.2	71.73	144.8	264.98	49.0	89.67	29.6	54.17	60.4	110.53
Orange	108.2	89.81	711.8	590.79	112.0	92.96	152.8	126.82	226.8	188.24
Orleans	27.2	79.97	110.2	323.99	19.0	55.86	16.6	48.80	29.6	57.62
Oswego	50.0	65.50	376.6	493.34	61.4	80.43	52.4	68.64	92.4	121.04
Otsego	50.6	104.23	386.2	795.57	90.4	186.22	23.2	47.79	28.6	58.91

Putnam	21.2	166.00	56.8	444.74	29.4	230.20	17.6	137.81	12.6	98.65
Rensselaer	208.8	171.22	715.6	586.79	158.8	130.21	150.8	123.66	259.6	212.87
Rockland	66.2	141.00	293.4	624.94	59.6	126.95	112.6	239.84	84.0	178.92
St. Lawrence	57.8	63.58	576.2	633.82	149.6	164.56	97.0	106.70	113.8	125.18
Saratoga	95.2	150.42	435.0	687.30	159.8	238.26	76.2	120.40	144.0	227.52
Schenectady	245.2	247.65	961.0	970.61	195.8	197.76	133.4	134.73	180.0	181.80
Schoharie	15.2	65.97	143.6	623.22	57.6	249.98	7.4	32.11	21.6	97.74
Schuyler	7.2	51.55	104.2	746.07	44.2	316.47	1.6	11.46	8.2	58.71
Seneca	33.0	130.68	240.6	952.78	78.2	309.67	15.4	60.98	72.8	288.29
Steuben	46.8	55.69	717.4	853.71	217.6	258.94	97.4	115.91	72.0	85.68
Suffolk	104.2	97.95	518.6	487.48	102.0	95.88	88.4	83.09	206.6	194.20
Sullivan	34.2	89.26	217.0	566.37	74.6	194.71	35.2	91.87	1,007.2	2,628.79
Tioga	33.0	129.03	130.2	509.08	36.4	142.32	20.4	79.76	16.8	65.69
Tompkins	29.4	80.26	213.4	582.58	52.8	144.14	11.0	30.03	93.4	254.98
Ulster	151.0	176.67	423.4	495.37	165.8	123.79	69.0	80.73	110.0	128.70
Warren	68.6	207.86	141.8	429.65	32.4	98.17	54.0	163.62	47.0	142.41
Washington	89.6	190.85	279.8	595.97	57.8	123.11	56.4	120.13	32.0	68.16
Wayne	69.8	123.43	467.0	859.28	129.8	238.83	38.4	70.61	50.8	93.47
Westchester	548.4	170.00	2,412.0	747.72	831.2	257.67	597.8	185.32	570.0	176.70
Wyoming	18.6	56.17	246.8	745.34	56.2	169.72	9.0	27.18	21.0	63.42
Yates	16.0	84.80	52.6	278.78	39.8	210.94	8.4	44.52	11.2	59.36

Table 14

FIVE YEAR AVERAGES OF CASES AND RATES OF IMPORTANT COMMUNICABLE DISEASES BY CITIES, 1917

CITIES	SCARLET FEVER		MEASLES		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Buffalo	619.6	136.31	2,839.8	622.56	1,411.8	310.60	844.4	185.77	1,451.8	319.40
Rochester	785.4	314.16	1,358.6	543.44	308.2	123.28	309.6	123.84	452.6	181.04
Albany	168.2	156.43	557.0	518.01	106.8	99.32	125.2	116.44	383.6	356.75
Binghamton	87.6	162.94	569.8	1,059.83	178.6	332.20	235.0	437.10	102.2	190.09
Schenectady	224.2	278.00	795.0	985.80	184.6	228.90	120.8	149.79	170.6	211.54
Syracuse	323.6	223.28	1,417.4	978.00	39.2	27.05	311.0	214.59	215.0	148.35
Troy	150.4	198.53	472.4	623.57	77.8	102.70	127.0	167.64	212.2	280.10
Utica	141.4	164.02	593.0	687.88	52.6	61.02	92.6	107.42	66.4	77.02
Yonkers	229.2	252.12	626.4	689.04	129.0	141.90	227.9	249.70	204.6	225.06
Amsterdam	54.6	158.89	226.0	657.66	86.8	252.59	42.0	122.22	110.0	320.10
Auburn	95.4	293.83	333.0	1,025.64	75.0	231.00	46.2	142.30	49.0	150.92
Cohoes	49.6	212.29	118.4	506.75	14.4	61.63	46.6	199.45	43.0	184.04
Elmira	39.0	97.11	345.8	861.04	20.4	50.80	75.0	186.75	68.2	170.50
Gloversville	15.2	71.74	218.8	1,032.74	72.8	343.62	27.2	128.38	36.6	172.75
Jamestown	82.0	217.30	559.8	1,483.47	173.8	460.57	50.4	133.56	55.2	146.28
Kingston	79.0	299.41	137.2	519.99	16.2	61.40	23.0	87.17	38.4	145.54
Mt. Vernon	62.8	167.05	368.6	980.48	171.2	455.39	51.0	135.66	48.6	129.28
Newburgh	24.2	86.88	267.2	959.25	26.2	94.06	39.2	140.73	84.8	304.43
New Rochelle	64.2	202.23	187.4	590.31	75.2	236.88	47.2	148.68	33.8	106.47
Niagara Falls	47.6	112.81	587.2	1,391.66	67.4	159.74	73.8	174.91	64.2	152.15
Oswego	15.0	58.95	13.8	54.23	6.0	23.58	13.2	51.88	30.2	118.69
Poughkeepsie	68.2	208.01	184.2	561.81	24.2	73.81	32.8	100.04	92.6	282.43
Rome	47.0	214.32	293.4	1,337.90	23.2	105.79	17.8	81.17	111.2	507.07
Watertown	7.2	26.78	278.2	1,034.90	139.4	1,034.90	30.0	111.60	32.6	121.27
White Plains	12.0	62.16	196.2	1,016.31	32.8	169.90	22.0	113.96	31.6	163.69
Batavia	25.4	191.26	11.0	82.83	44.0	331.32	11.4	85.84	15.6	117.47
Corning	10.2	75.79	97.2	722.20	20.6	153.05	28.6	212.50	20.8	154.54
Cortland	18.6	149.92	189.8	1,529.78	40.2	324.01	16.6	133.80	16.0	128.96
Dunkirk	16.6	92.79	186.4	1,041.97	97.7	546.14	16.6	92.79	17.4	97.27
Fulton	18.6	167.03	147.2	1,321.86	12.0	107.76	26.6	238.87	15.8	141.88
Geneva	10.6	80.14	28.8	217.73	2.8	21.17	8.2	61.99	9.0	68.04
Glens Falls	53.8	329.79	86.8	532.08	9.6	58.85	44.8	274.63	30.8	188.80
Hornell	10.8	75.28	17.8	124.07	64.6	450.26	32.0	223.04	17.0	118.49
Hudson	12.6	109.12	46.0	398.36	12.4	107.38	24.4	214.30	25.0	216.59
Ithaca	18.6	111.04	122.6	731.92	33.0	197.01	3.2	19.10	51.4	306.85
Johnstown	5.0	46.80	84.8	793.73	10.0	93.60	18.6	174.10	10.6	99.22
Lackawanna	24.6	156.21	167.4	1,062.99	86.0	546.10	47.6	302.26	39.4	250.17

Little Falls	28.2	216.58	122.6	941.57	44.2	339.46	26.4	202.75	25.2	199.54
Lockport	15.0	80.25	256.2	1,370.67	66.8	357.38	15.8	84.53	24.2	129.47
Middletown	12.0	73.20	85.0	518.50	3.8	23.18	29.2	178.12	37.2	226.92
North Tonawanda	13.8	102.26	223.2	1,653.91	60.4	447.56	28.0	207.48	18.0	133.38
Ogdensburg	5.2	36.24	22.8	158.92	.....	.....	23.6	164.49	13.0	90.61
Olean	18.4	102.67	143.2	799.05	39.4	219.85	19.6	109.37	30.2	168.52
Oneonta	13.4	114.57	26.6	227.43	18.4	157.32	6.6	56.43	6.2	53.01
Peekskill, village	19.6	126.42	133.8	863.01	81.8	527.61	37.6	242.52	36.4	234.78
Port Chester, village	15.8	104.44	123.2	814.35	16.8	111.05	23.6	156.00	24.4	161.28
Rensselaer	12.0	107.04	36.0	321.12	12.8	114.18	30.6	272.95	7.2	64.22
Saratoga Springs	15.4	111.65	118.6	859.85	76.0	551.00	20.0	145.00	33.8	245.05
Watervliet	25.2	168.08	41.0	273.47	9.2	61.36	26.8	178.76	17.2	114.72
Beacon	21.2	238.13	39.4	387.70	10.6	104.30	16.6	163.34	21.0	206.64
Canandaigua	11.2	149.18	8.4	111.89	3.6	47.95	5.8	77.26	7.4	98.57
Mechanicville	34.4	418.99	84.6	1,030.43	10.2	124.24	6.4	77.95	5.4	65.77
Norwich	4.6	55.15	8.4	100.72	2.2	26.38	12.4	148.68	5.6	67.14
Oneida	6.0	63.42	10.0	105.70	3.8	40.17	4.0	42.28	3.4	35.94
Ossining, village	18.8	181.98	74.0	716.34	21.2	205.22	14.6	141.33	15.2	147.14
Plattsburg	10.6	104.62	115.2	1,137.02	16.8	165.82	13.0	128.31	14.4	142.13
Port Jervis	18.2	193.28	65.4	694.55	12.2	129.56	64.0	679.68	20.8	220.90
Salamanca	5.0	59.75	43.4	518.63	3.4	140.63	4.0	47.80	2.4	28.68
Tonawanda	6.2	67.77	119.8	1,309.41	17.2	188.00	17.6	192.37	8.4	91.81

Table 15

TYPHOID FEVER — CASES AND DEATHS, FOR COUNTIES, BY MONTHS, 1917

COUNTY	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		TOTAL	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Albany	19	2	13	0	22	3	15	1	11	2	15	2	20	1	27	2	115	2	83	0	30	5	35	2	417	22
Allegany	2	0	1	0	4	0	3	0	7	0	12	3	5	0	1	1	2	0	0	0	1	0	0	0	38	4
Broome	5	2	2	0	3	1	3	1	0	0	1	0	1	1	0	2	6	1	1	0	1	0	1	0	24	8
Cattaraugus	1	0	2	0	1	0	3	0	1	1	0	1	3	0	3	0	0	0	1	0	0	0	0	0	15	2
Cayuga	1	0	0	0	0	0	1	0	2	1	0	0	1	0	3	0	1	1	3	0	2	1	5	0	19	3
Chautauqua	0	0	2	1	5	0	3	0	1	0	4	0	5	0	11	0	8	0	8	1	4	2	6	0	57	4
Chemung	4	1	0	0	0	0	2	1	1	0	0	0	2	0	6	1	18	1	2	0	3	0	7	1	45	5
Chenango	1	0	1	0	1	0	2	0	0	1	7	1	1	1	3	0	6	0	2	0	2	0	1	0	27	3
Clinton	4	0	2	1	3	1	2	1	4	0	3	0	4	0	13	2	6	4	2	0	2	0	0	0	45	9
Columbia	3	1	0	1	4	0	3	0	2	0	3	0	4	0	3	1	3	0	2	0	4	0	1	1	32	4
Cortland	1	0	1	0	0	0	0	0	0	0	1	0	1	0	4	1	0	0	1	0	4	0	3	0	16	1
Delaware	1	2	1	0	0	0	2	0	0	0	0	0	0	0	3	0	4	1	4	3	0	0	1	0	16	6
Dutchess	2	0	2	0	3	0	5	1	2	0	3	0	21	0	8	2	5	0	5	1	2	1	0	0	58	5
Erie	29	4	31	4	17	2	12	5	14	5	12	5	18	4	34	3	46	5	30	1	28	7	13	4	284	49
Essex	1	0	1	0	4	0	2	0	0	0	2	0	1	0	17	0	5	2	1	0	0	0	0	0	34	2
Franklin	0	0	5	1	1	0	2	0	1	0	4	0	2	1	4	0	2	2	5	2	2	1	1	1	29	8
Fulton	0	0	0	0	1	0	0	0	0	0	2	0	1	0	3	0	0	1	0	0	0	0	0	0	7	1
Genesee	2	0	1	1	2	0	0	0	0	0	1	0	1	0	7	0	9	1	3	0	2	1	3	0	31	3
Greene	5	1	4	0	10	0	2	1	2	0	4	0	1	0	0	0	3	0	2	0	5	1	1	0	39	3
Hamilton	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	0
Herkimer	1	0	0	0	0	0	2	0	1	1	1	0	3	1	4	0	10	0	2	1	3	1	1	0	28	4
Jefferson	7	0	6	0	8	2	4	0	5	0	2	0	4	0	13	0	5	2	9	0	16	1	2	0	75	3
Lewis	0	0	0	0	1	0	0	0	0	0	1	0	1	2	1	1	3	0	0	0	0	0	0	0	7	3
Livingston	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	1	1	0	0	0	5	1
Madison	0	1	0	0	0	0	0	0	1	0	0	0	2	0	3	1	1	0	0	0	0	0	0	0	7	2
Monroe	6	0	10	1	10	1	12	0	5	0	6	0	7	0	11	1	11	3	9	2	9	1	2	0	92	9
Montgomery	1	0	1	0	0	0	2	0	1	1	1	0	0	0	0	0	2	0	1	0	1	0	2	0	12	1
Nassau	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	7	0	0	0	0	0	4	0	15	1
Niagara	8	2	3	0	9	1	8	5	3	0	2	0	3	0	13	3	29	2	6	0	4	1	7	1	97	15
Oneida	6	0	57	4	12	3	7	1	4	1	3	0	3	0	5	2	7	2	10	1	11	1	1	3	126	13
Onondaga	6	0	2	2	21	1	4	2	8	0	2	1	4	4	5	1	13	3	4	2	2	0	4	1	75	17
Ontario	3	0	1	0	0	0	4	0	5	0	6	0	4	0	4	1	1	1	17	1	6	1	4	0	49	4
Orange	2	0	0	0	3	0	0	0	4	0	1	1	1	0	6	1	6	1	5	0	2	2	2	1	32	6
Orleans	3	0	0	0	2	1	1	0	1	0	1	0	3	0	3	0	1	0	0	0	0	0	0	0	15	1
Oswego	1	0	3	0	3	0	0	1	0	0	0	0	0	0	5	0	6	0	3	0	4	0	4	0	29	1
Otsego	0	0	1	0	2	0	1	1	0	0	4	2	5	0	7	1	6	0	1	0	1	0	0	0	29	4

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Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS

DISTRICT (Population June 15, 1915)	TYPHOID FEVER		MEASLES		SCARLET FEVER		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS CASES		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Albany county	183,330	417	22	1,309	35	230	238	9	138	15	480	24	504
Albany, city	107,979	138	13	711	32	132	105	2	77	9	384	20	404
Cohoes, city	23,433	9	3	59	1	5	64	5	15	2	38	1	39
Watervliet, city	14,990	203	1	101		28	20		14	3	18	1	19
Berne	1,638			2			4						
Bethlehem	5,590	16		39		6	5		3		10	1	11
Coeymans	2,881	10	1	20		1					1		1
Ravena, village	1,700	5	1	21		7			11	1	5		5
Colonie	9,989	18		53		24	9		13		5	1	6
Green Island													
Green Island, village	4,533	6		165	2	25	4		4		7		7
Guilderland	2,885			1							4		4
Altamont, village	805	2	1	5		1					2		2
Knox	1,101			8		1					1		1
New Scotland	2,374	4	1	24			8	1	1		3		3
Voorheesville village	550			2							1		1
Rensselaerville	1,619	6	1	61			1				1		1
Westerlo	1,263			36			18	1					
Allegany county	40,216	38	4	338	1	42	435	2	23	1	23	1	24
Alfred	818			13		2							
Alfred, village	677			13									
Allen	627			8									
Alma	752	1											
Almond	1,279			1			21						
Amity	984	4		7			19	1			2		2
Belmont, village	1,031			3			29						
Andover	859			61	1		1		1		1		1
Andover, village	1,154			128			2		6		3		3
Angelica	580			3		1	1				1		1
Angelica, village	1,138			2			26						
Belfast	1,477	1		5		1	4				1		1
Birdsall	564						2						
Bolivar	920	3	1	8		3	5		1				
Bolivar, village	1,260	2		2		4	2		1				
Burns	621			20			2		1				
Canaseraga, village	668			5			1				2		2
Canadea	1,250			19		1	1						
Centerville	813			1			1						
Clarksville	743					2	12		1				
Cuba	731						10				2		2
Cuba, village	1,645	1		2		1	15						
Friendship	851	1		4		1	5				1		1
Friendship, village	1,199					7	26		1				
Genesee	1,061			1					1				
Granger	709												
Grove	752			1			4				1		1
Hume	1,915	1		2		6	14		2	1	3		3
Independence	1,177			6									
New Hudson	762			1		4	1				2		2
Rushford	1,326	1					61						
Scio	1,064	1		2									
Ward	506			8		1	4	1			1		1
Wellsville	1,261	10					4						
Wellsville, village	4,595	10	3	8		7	160		6		1	1	2
West Almond	462			2							2		2
Willing	924			1									
Wirt	681	1		1			1		1				
Richburg, village	380	1				1			1				

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Broome county..... 90,641	24	8	1,241	12	506	7	651	20	524	41	127	1	128
Binghamton, city..... 53,668	12	7	746	8	219	2	502	13	349	24	97	.....	97
Binghamton State Hospital....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	7	.....	7
Barker..... 987	.....	.....	12	.....	.....	.....	12	.....	2	.....	.....	.....	.....
Binghamton..... 731	.....	.....	.....	.....	1	.....	.....	.....	1	1	.....	.....	.....
Chenango..... 1,273	.....	.....	21	.....	3	.....	2	.....	1	1	.....	.....	.....
Colesville..... 2,525	.....	.....	7	.....	4	.....	1	.....	4	.....	.....	.....	.....
Conklin..... 942	.....	.....	15	.....	4	.....	.....	.....	3	1	.....	.....	.....
Dickinson..... 639	.....	.....	5	.....	3	.....	.....	1	6	.....	.....	.....	.....
Port Dickinson, village 583	2	.....	48	.....	1	.....	40	.....	4	.....	.....	.....	.....
Fenton..... 1,240	5	.....	2	.....	18	.....	7	1	3	.....	1	.....	1
Kirkwood..... 942	.....	.....	6	.....	2	.....	.....	.....	2	1	.....	.....	.....
Lisle..... 1,136	1	.....	14	.....	.....	.....	13	.....	1	.....	.....	.....	.....
Lisle, village..... 347	.....	.....	4	.....	1	.....	7	.....	.....	.....	.....	.....	.....
Maine..... 1,339	.....	.....	4	.....	1	.....	3	2	4	.....	.....	.....	.....
Nanticoke..... 549	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sanford..... 1,779	1	.....	64	1	12	.....	1	.....	.....	.....	1	.....	1
Deposit, village..... 1,026	.....	.....	112	.....	6	.....	.....	.....	.....	.....	1	.....	1
Triangle..... 879	.....	.....	19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Whitney Point, village. 760	.....	.....	14	.....	.....	.....	1	.....	1	.....	.....	.....	.....
Union..... 2,333	.....	.....	4	1	16	.....	2	2	12	2	1	.....	1
Endicott, village..... 5,581	2	.....	23	1	107	2	5	.....	29	3	10	1	11
Johnson City, village.. 5,400	.....	.....	103	1	37	1	51	1	66	5	5	.....	5
Union, village..... 1,922	1	1	6	.....	38	2	1	.....	22	2	2	.....	2
Vestal..... 1,688	.....	.....	1	.....	1	.....	1	.....	8	.....	.....	.....	.....
Windsor..... 1,719	.....	.....	4	.....	7	.....	.....	.....	6	1	1	.....	1
Windsor, village..... 665	.....	.....	3	.....	8	.....	.....	.....	1	.....	1	.....	1
Cattaraugus county... 72,756	15	2	323	4	101	.....	126	3	70	7	58	3	61
Olean, city..... 17,925	5	1	37	.....	37	.....	79	2	42	4	24	.....	24
Salamanca, city..... 8,370	2	.....	18	.....	4	.....	1	.....	2	1	3	.....	3
Allegany..... 2,029	.....	.....	6	.....	1	.....	.....	.....	1	.....	1	.....	1
Allegany, village..... 1,327	.....	.....	1	.....	4	.....	2	.....	4	.....	3	1	4
Ashford..... 1,524	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Carrolton..... 797	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Limestone, village.... 463	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	.....	.....	.....
Cold Spring..... 722	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Conewango..... 954	.....	.....	4	.....	.....	.....	5	1	.....	.....	.....	.....	.....
East Randolph, village. 582	.....	.....	1	.....	1	.....	2	.....	.....	.....	.....	.....	.....
Dayton..... 1,141	.....	.....	.....	.....	2	.....	2	.....	.....	.....	1	.....	1
South Dayton, village. 629	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
East Otto..... 1,052	.....	.....	7	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Elko..... 302	.....	.....	22	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ellicottville..... 963	.....	.....	10	.....	3	.....	.....	.....	.....	.....	1	.....	1
Ellicottville, village... 881	.....	.....	35	.....	3	.....	.....	.....	.....	.....	1	.....	1
Farmersville..... 976	.....	.....	.....	.....	6	.....	.....	.....	.....	.....	3	.....	3
Franklinville..... 1,109	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	1
Franklinville, village.. 2,065	.....	.....	2	.....	.....	.....	.....	.....	1	.....	2	1	3
Freedom..... 1,124	.....	.....	15	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Great Valley..... 1,513	1	.....	12	.....	.....	.....	5	.....	.....	.....	1	.....	1
Hinsdale..... 1,090	2	.....	23	1	.....	.....	7	.....	.....	.....	1	.....	1
Humphrey..... 625	.....	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Ischua..... 775	.....	.....	12	1	1	.....	2	.....	.....	.....	.....	.....	.....
Leon..... 925	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Valley..... 529	2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Valley, village.. 1,307	2	1	11	.....	1	.....	.....	.....	.....	.....	4	.....	4
Lyndon..... 549	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Machias..... 1,575	.....	.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mansfield..... 867	.....	.....	.....	.....	.....	.....	1	.....	1	1	.....	.....	.....
Napoli..... 783	.....	.....	1	.....	8	.....	.....	.....	.....	.....	1	.....	1
New Albion..... 876	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Cattaraugus, village... 1,276	.....	.....	3	.....	.....	.....	1	.....	.....	.....	3	.....	3
Olean..... 1,324	1	.....	5	.....	4	.....	1	.....	1	.....	.....	.....	.....
Otto..... 839	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)		Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Cattaraugus county—*Continued*														
Perrysburg	858											1		1
Perrysburg, village	265					1		1						
Persia										1				
Gowanda, village	1,800					7		3		1		3		3
Portville	1,690			5				3		4		2		2
Portville, village	765									1		1		1
Randolph	843							2						
Randolph, village	1,341							8		1		1	1	2
Red House	700													
Salamanca	414			1	1									
South Valley	497									1	1			
Yorkshire	1,082			21		2				2				
Delevan, village	557			63		5								
Cayuga county	65,751	19	3	373	2	94		33	1	69	9	30	2	32
Auburn, city	32,468	10	2	38		43				47	8	17		17
Aurelius	1,096					8								
Cayuga, village	373													
Brutus	990			24		3		1						
Weedsport, village	1,448			62		3				2	1	3		3
Cato	1,173	1		6		10				3		1		1
Cato, village	390			5		2		7		5				
Meridian, village	313					1								
Conquest	1,225			2		4						1		1
Fleming	1,031			3				1		1				
Genoa	1,853	1		2								2	1	3
Ira	1,179	1		11						1				
Ledyard	1,233					2								
Aurora, village	396													
Locke	843			30	1									
Mentz	876			2		1								
Port Byron, village	1,115	1		49										
Montezuma	914	1		2						7		1		1
Moravia	846			7		1				1				
Moravia, village	1,393	1		64				4				1		1
Niles	1,254			16		1						1		1
Owasco	1,503	1		14		3						2		2
Scipio	1,417			2				1						
Sempronius	743			2										
Sennett	1,481			6	1	8				1				
Springport	740	1				1								
Union Springs, village	762			2										
Sterling	1,845	1	1	10		1		1		1				
Fairhaven, village	624			1									1	1
Summer Hill	604													
Throop	963											1		1
Venice	1,402			4										
Victory	1,258			9		2		18	1					
Chautauqua county	116,818	57	5	668	5	184	4	620	19	185	5	107	1	108
Dunkirk, city	17,870	7	2	43		9		190	8	32	1	12		12
Jamestown, city	37,780	17	2	278	2	72	2	182	4	106	3	58	1	59
Arkwright	843			2										
Busti	1,649			3		1				5				
Lakewood, village	702	1		4		1	1	6						
Carroll	1,714	2		5		1				1				
Charlotte	801			1		2		14						
Sinclairville, village	582											3		3
Chautauqua	2,732			9										
Mayville, village	1,201			2					1			2		2
Chautauqua, village		1		2				4						
Cherry Creek	910					3						1		1
Cherry Creek, village	720			1										
Clymer	1,341													

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)		TYPHOID FEVER		MEASLES		SCARLET FEVER		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS CASES		
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Chautauqua county — *Con.*														
Dunkirk														
Ellery	1,606	1		9				7		1		1		1
Bemus Point, village	270											1		1
Ellicott	2,154			7		2		2	1					
Celoron, village	720	1												
Falconer, village	2,342	5		49	1	5				1		2		2
Ellington	1,317			1								1		1
French Creek	941			1	1				1					
Gerry	1,119			1		10								
Hanover	2,505	1		33	1			11		1		1		1
Forestville, village	740			5								1		1
Silver Creek, village	3,220	3		39				1	1	20		3		3
Harmony	2,720	4	1	10				12				1		1
Panama, village	352			3								1		1
Kiantone	641			1		3				1				
Mina	1,021	1				12								
Poland	1,442			3		2				2		2		2
Pomfret	2,207	1		3		6		37		2				
Fredonia, village	5,328	6		17		21		116	3	3		4		4
Portland	2,060			3		19		4		1		1		1
Brocton, village	1,292					1	1	14				2		2
Ripley	2,482			21		11		1		6	1	5		5
Sheridan	2,077			6		2		4		3				
Sherman	783													
Sherman, village	949			3										
Stockton	1,830	1						9				1		1
Villenova	1,148			18								1		1
Westfield	1,338			14										
Westfield, village	3,319	5		71		1		6				3		3
Chemung county	59,017	45	5	245		75	3	106	2	93	3	140	4	144
Elmira, city	40,093	40	5	52		31	2	10	1	72	2	112		112
Elmira Reformatory												18		18
Ashland	350					1								
Wellsburg, village	478							1		1				
Baldwin	530					1								
Big Flats	1,495	1		1		1								
Catlin	834			11										
Chemung	1,383			1		3		1						
Elmira	1,385												1	1
Elmira Hts., village	3,154			114		6	1			17	1	3	1	4
Erin	840			1									1	1
Horseheads	1,516			1		5				1		3		3
Horseheads, village	1,949	2		2		20		85		2				
Southport	2,320	2		3		3		6				2		2
Van Etten	709			12				2				1		1
Van Etten village	407			41		1						1		1
Veteran	1,565			6		3		1	1				1	1
Chenango county	36,648	27	3	263		46		40		56		24	4	28
Norwich city	8,342	5		10				11		37		6		6
Afton	1,055			4						2				
Afton, village	754			11		3				1				
Bainbridge	803			13		2		1		4				
Bainbridge, village	1,201	4		12		4		5				1		1
Columbus	794			5				2						
Coventry	793	1		1		1								
German	412													
Greene	1,687	1		32		18		13						
Greene, village	1,272	1	1	2		6		1						
Guilford	1,963			1								2		2
Lincklaen	532													
McDonough	825	1												
New Berlin	1,311			19		1		2						
New Berlin, village	1,131			131								1		1

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)		Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Chenango county — *Con.*														
North Norwich	699	1								1				
Norwich	1,201	1										1	3	4
Otselic	967											1		1
Oxford	1,479			1								2		2
Oxford, village	1,594	6	1	11		2				6		3		3
Pharsalia	699	1												
Pitcher	656	2		2										
Plymouth	959									1		1		1
Preston	640	1										1		1
Sherburne	1,539			5		1				1		1	1	2
Sherburne, village	1,016	1	1							1		3		3
Earlville, village	253											1		1
Smithville	932			2		4				2				
Smyrna	892					3		5						
Smyrna, village	247	1		1		1								
Clinton county	47,561	45	9	168	1	93	1	127	9	71	12	55	1	56
Plattsburg, city	10,134	19	4	1		42	1	13	2	26	1	13		13
Altona	2,328	1	1			1		4				1		1
Ausable	971											1		1
Keeseville, village	997	5	1						1			1		1
Beekmantown	1,862			15	1			18	1	1	1			
Black Brook	1,962	2		1				1		5		4		4
Champlain	1,517	3	1	2				11		6				
Champlain, village	1,279	2		7						1		2		2
Rouses Point, village	1,783	4	2	3		1					1			
Chazy	3,187	3		6		2		34	3	13	4	2		2
Clinton	1,386	2		35					1	1		4		4
Dannemora	3,793			12		4				2	1			
Dannemora, village	869			1				3						
Ellenburgh	2,965			30		5				4	1		1	1
Mooers	2,653			52		22		7		1		4		4
Mooers, village	522	2				4				3	2			
Peru	2,356			2		2				6				
Plattsburg	2,380					2		17		1	1	1		1
Saranac	2,984	2				6		4	1	1		5		5
Schuyler Falls	1,633			1		2		15						
Dannemora St. Hosp.												17		17
Columbia county	44,111	32	4	149	1	67	1	125	3	21		95	6	101
Hudson, city	11,544	16	2	81		2		8		14		33	2	35
N. Y. S. Training School for Girls													1	1
Ancram	1,110			1		1		3		1		5	1	6
Austerlitz	889			1						1		3		3
Canaan	1,057					1		21				1		1
Chatham	2,215			1		5		2				2	1	3
Chatham, village	2,389			1		21		18	1			6	1	7
Claverack	2,343	3	1	5		3		11				5		5
Philmont, village	2,060	1		1				2				5		5
Clermont	881	1										1		1
Copake	1,368	3		3		5						2		2
Gallatin	780							7	1			6		6
Germantown	1,745	1		13								5		5
Ghent	1,815			1						1		2		2
Greenport	1,470	2		5				1				2		2
Hillsdale	1,313			12	1	3		5	1	1		1		1
Kinderhook	1,109							4						
Kinderhook, village	827			1		2						2		2
Valatie, village	1,410	1		1								3		3
Livingston	1,522			18		1		19		1		2		2
New Lebanon	1,369			1		1		8		1		2		2
Stockport	2,313	1				2	1			1		3		3
Stuyvesant	1,841	3	1	3		20		1						
Taghkanic	741							15				3		3
State Farm for Women												1		1

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)		TYPHOID FEVER		MEASLES		SCARLET FEVER		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS CASES		
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Cortland county	30,074	16	1	1,013	1	38	4	9		5	1	36	7	43
Cortland, city	12,367	10	1	664		12	1	3		1		24	6	30
Cincinnatus	958			7				1						
Cortlandville	2,379			62		2	1	2		1	1			
McGrawville, village	887	1		81		1								
Cuyler	945											1	1	2
Freetown	511	1		1	1	4								
Hartford	728			21										
Homer	874	1		15		2	1					1		1
Homer, village	2,871			43		2		1		2		1		1
Lapeer	465			10								1		1
Marathon	494			12				1						
Marathon, village	1,006	1		7				1				5		5
Preble	761			11						1				
Scott	683			58		13	1							
Solon	545			17										
Taylor	703					1								
Truxton	1,089			1		1						1		1
Virgil	1,201	1		1								2		2
Willet	607	1		2										
Delaware county	45,995	16	6	439	1	30		105	5	24	1	40	3	43
Andes	1,679			4		1		3		1		4		4
Andes, village	405			2										
Bovina	867											1		1
Colchester	3,250	7	2	4		2						4		4
Davenport	1,393			10						1				
Delhi	1,109			4								3		3
Delhi, village	1,743			3										
Deposit	892	1		64		1						1		1
Deposit, village	753			71	1							1		1
Franklin	1,781	1										1		1
Franklin, village	441												1	1
Hamden	1,387			3		4		3				3	1	4
Hancock	3,552			7		6			1	5	1	5		5
Hancock, village	1,356			28		1		7						
Harpersfield	936			14				2						
Stamford, village	1,060	1	1	4				6				3		3
Kortright	1,608			11										
Masonville	988			40				10						
Meredith	1,472			2				1						
Middletown	2,611			75				34	1	1		1		1
Fleischmanns, village	767			1								1		1
Margaretville, village	648			15				2						
Roxbury	2,318		1	13		6		3		1		1		1
Sidney	1,574	1		2		1						1	1	2
Sidney, village	2,641	1	1	3		2		11	2	5		1		1
Stamford	974	2	1	1				7		5		1		1
Hobart, village	596													
Tompkins	1,919			47		1		5				2		2
Walton	1,669	1		5				9	1			2		2
Walton, village	3,606	1		6		5		2		5		4		4
Dutchess county	91,044	58	5	245		124	3	308	10	115	9	295	13	308
Beacon, city	10,165	2		166				29	3	29		26	5	31
Poughkeepsie, city	32,714	15	3	22		45		45	5	31	3	126	2	128
Matteawan State Hosp												9		9
Amenia	2,204					5	1	11				2	1	3
Beekman	951					1				6				
Clinton	1,333									1		4		4
Dover	1,967			1		3		27						
East Fishkill	2,173	4		1		4						3		3
Fishkill	2,683	1		9						6		8		8
Fishkill, village	531							1				2		2
Hyde Park	3,144	1		1		32		1		4		1		1

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Dutchess county — *Continued*													
LaGrange 1,326	1		1		1						6		6
Milan 824					1		1		1				
Northeast 1,452					2				3	1	1		1
Millerton, village 890			2						1		1		1
Pawling 1,153					1		5				2		2
Pawling, village 1,050							1		3		2		2
Pine Plains 1,387	1		1				18		5		1		1
Pleasant Valley 903									3				
Pleasant Valley, village 429									1		1		1
Poughkeepsie 4,937	1		3		5		1		3	2	13		13
Wappingers Falls, vil. 3,742	2		4		14	2			2		6	1	7
Red Hook 1,805	1	1			1		7					1	1
Red Hook, village 923									2		2		2
Tivoli, village 1,080									3				
Rhinebeck 1,905	1		11		1		2				3	1	4
Rhinebeck, village 1,580			14								1		1
Stanford 1,582	1		4				46				1		1
Union Vale 1,149	2	1					48		5	1			
Wappinger 1,524	2		4		2				1		1		1
Washington 2,286	7		1		5		22	1	1				
Millbrook, village 1,252	16				1		43	1			2		2
Hudson River State Hospital									4	2	71	2	73
Erie county 571,897	315	56	1,169	60	770	32	2,394	84	1,300	125	1,820	135	1955
Buffalo, city 454,630	213	47	869	7	629	30	1,821	54	1,051	108	1,628	108	1736
Lackawanna, city 15,737	15		190	52	17		190	20	68	4	60	8	68
Tonawanda, city 9,147	21		3		10		36		14	1	11	2	13
Buffalo State Hospital	3		1				1		2		12	1	13
Alden 2,089			1		1		2		3		1	2	3
Alden, village 777					1								
Amherst 4,117	1		19		1		5		1		1		1
Williamsville, village 1,272			1		2		1		2		1		1
Aurora 2,001					1		9		3	1	1		1
East Aurora, village 3,445	1		6		4		25		4		2	1	3
Boston 1,489			2								1	1	2
Brant 2,218					6		6	1	2		3		3
Farnham, village 636					5								
Cheektowaga 6,441	5		15		20		49	2	31	2	19	2	21
Depew, village 4,932			1		4				8		7	1	8
Sloan, village 2,202					2			1	4	1	1		1
Clarence 3,082	3	1			1						2		2
Colden 1,390							3						
Collins 1,929	1		1	1			2		1		1		1
Gowanda, village 724			1		1		4						
Concord 1,882	2		2		1		1						
Springville, village 2,688	2	1			2		2		4	1	3	2	5
East Hamburg 3,004	1		1		4		10		8	1	6		6
Eden 2,616	2				2		7		1	1	1		1
Elma 2,282	1		1				17				1		1
Evans 2,450					1				2		2		2
Angola, village 1,194			4		2						1	1	2
Grand Island 964	2												
Hamburg 3,690	1		3		4		7		7	1	3	1	4
Blasdell, village 940	2				1				2		1		1
Hamburg, village 2,744	2		4		11				22	1	4	3	7
Holland 1,584					3								
Lancaster 2,466			3		1		16		1		8		8
Lancaster, village 5,094	4		8		9		22	1	8		6	2	8
Marilla 1,409					7	1	3		2				
Newstead 2,167	1				1		1		1		2		2
Akron, village 1,856					3				20	1	2		2
North Collins 1,637			2		3						1		1
North Collins, village 1,068					2				7				
Sardinia 1,661			1				2		7	1			

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Erie county — *Continued*													
Tonawanda..... 1,362	2		1		1	1	2	1	1		4		4
Kenmore, village..... 1,700			1		2						4		4
Wales..... 1,197			1				4						
West Seneca..... 5,926	2		4		4		56	2	12	3	13		13
Indian Reservation... 58													
Thomas Indian School.....									1				
Gowanda State Hospital.....	28	7	23		1						7		7
Essex county..... 32,461	41	3	298		39		66	1	33	1	104	8	112
Chesterfield..... 1,067	1										1		1
Keeseville, village.... 798											1		1
Crown Point..... 1,605			2		1						1		1
Elizabethtown..... 675							2		4		2		2
Elizabethtown, village. 530											4		4
Essex..... 1,193													
Jay..... 2,382	1		5						3		4		4
Keene..... 1,138			1				5		1		6	2	8
Lewis..... 844			9		1							1	1
Minerva..... 705					1								
Moriah..... 3,423	2		1		13				12	1	8	2	10
Port Henry, village... 2,584	1										3		3
Newcomb..... 511					1								
North Elba..... 1,053	2		17		1				1		7		7
Lake Placid, village... 1,977	1		127		19				2		19	1	20
Saranac Lake, village. 903			3		2		3				34	1	35
North Hudson..... 477	2	1											
St. Armand..... 558	17		5								1		1
Bloomingdale, village.. 394	2		2								1		1
Schroon..... 967											2		2
Ticonderoga..... 1,992	3		2				39	1	1		3		3
Ticonderoga, village... 2,754	1		2				10		3		4	1	5
Westport..... 970			11								2		2
Westport, village..... 716			19										
Willsboro..... 1,652			6				7				1		1
Wilmington..... 593	1	1	85						1				
Raybrook.....	7	1	1										
Franklin county..... 46,181	29	8	452	3	34	1	70	7	62	7	1,265	27	1290
Altamont..... 570			1					1	1	1	1	1	2
Tupper Lake, village.. 3,910					1				4	3	3		3
Bangor..... 2,179									1				
Belmont..... 2,031											2		2
Bombay..... 1,337	1										2		2
Brandon..... 860											1		1
Brighton..... 777			30				11		1			1	1
Burke..... 1,835			1				5		1		2		2
Chateaugay..... 1,707			45	1					5		4		4
Chateaugay, village... 1,196			51						11		1		1
Constable..... 1,331	1	1			2			1			1		1
Dickinson..... 1,514							32	2			1		1
Duane..... 255													
Fort Covington..... 1,217	1										3		3
Fort Covington, village 828											3	1	4
Franklin..... 1,378			28	1					2	1			
Harrietstown..... 701			22		3						9		9
Saranac Lake, village. 4,015	1		172	1	22	1	7		2		1,201	19	1220
Malone..... 3,851	1	1						1	7		2		3
Malone, village..... 7,404	17	5	3		2		1	1	24	2	25	1	26
Moira..... 2,413			54		2		8		1		1		1
Santa Clara..... 525									1				
Waverly..... 2,133	5	1	45		2		6		1		1	2	3
Westville..... 1,128	2							1			1		1
Indian Reservation... 1,086													

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)		Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Fulton county	45,625	7	1	171		32		108	6	74	7	79	5	84
Gloversville, city	21,178	3	1	39		18		57	3	68	6	44		44
Johnstown, city	10,687			114		1		43	1	3		14	4	18
Bleecker	498					3								
Broadalbin	2,030	2				2				1	1	3		3
Caroga	516													
Ephratah	1,288	1		5								2		2
Johnstown	2,694								1					
Mayfield	1,500					7		1	1					
Mayfield, village	595	1		1										
Northampton	596			2				1		1		6	1	7
Northville, village	1,635			2				6		1		8		8
Oppenheim	974			8		1						2		2
Dolgeville, village	187													
Perth	713													
Stratford	534													
Genesee county	40,707	31	3	97	2	107		38	1	26	2	34	2	36
Batavia, city	13,278	12	1	10		44		17	1	8	1	20	2	22
N. Y. State School for Blind								1						
Alabama	1,697					1				4	1			
Alexander	1,144					2		4		2		1		1
Alexander, village	259													
Batavia	2,062			3		3		2				2		2
Bergen	1,077			10		6				2		1		1
Bergen, village	639					11				4				
Bethany	1,394					1						2		2
Byron	1,501													
Darien	2,013							10		3		3		3
Elba	1,315	2		3	1	1		1						
Elba, village	439	1												
Leroy	1,746	3		5		1								
Leroy, village	4,034	12	2	66	1	13				2		3		3
Oakfield	950					1						1		1
Oakfield, village	1,307					10								
Pavilion	1,615											1		1
Pembroke	1,958	1				3								
Corfu, village	515					10				1				
Stafford	1,259													
Indian Reservation	455													
Greene county	30,091	39	3	103		16		41	3	8	1	55	7	62
Ashland	658					1						3		3
Athens	800			1				2		1		2		2
Athens, village	1,925	7		10				2		1				
Cairo	1,967	2						2		1		7	2	9
Catskill	3,650	5	1	1				19	3	1		7	1	8
Catskill, village	5,371	14	1	4		1		12		2		6		6
Coxsackie	1,144	1	1	8								3		3
Coxsackie, village	2,309			1		3						7	1	8
Durham	1,363	1		5								2		2
Greenville	1,550	1		50		1		1		1		8	2	10
Halcott	353			3		1								
Hunter	1,781			3								2		2
Hunter, village	405													
Tannersville, village	758													
Jewett	1,014	2		1										
Lexington	926	1		13		3		2				2		2
New Baltimore	1,840	5		2		6		1		1	1	3	1	4
Prattsville	887													
Windham	1,390			1								3		3

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)		TYPHOID FEVER		MEASLES		SCARLET FEVER		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS CASES		
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Hamilton county	4,491	4		6		2		93		1	1	3	1	4
Arietta	319													
Benson	155													
Hope	250													
Indian Lake	1,086	2		6		1				1	1	1		1
Inlet	219	2												
Lake Pleasant	429					1		93				2	1	3
Long Lake	1,058													
Morehouse	133													
Wells	842													
Herkimer county	64,109	28	4	872	7	38	1	273	4	49	6	123	15	138
Little Falls, city	13,022	6	3	126	1	6		76	1	8	1	24		24
Columbia	1,090	1		13										
Danube	1,050			1		1		1	1			1		1
Fairfield	957			6				3		1		4		4
Middleville, village	710			10								4		4
Frankfort	1,749	1		8		2		1				3		3
Frankfort, village	4,213	1		9		2		14		1		3	3	6
German Flats	1,332	2		5		2		11				1		1
Mohawk, village	2,577			52	1	4		50		1		1	1	2
Ilion, village	8,900	3		390	3	3		9		3		12	3	15
Herkimer	1,450	1		5		1						14		14
Herkimer, village	9,577	2		50	1	6	1	44	1	4		20	2	22
Litchfield	836			1						1		1		1
Little Falls	627					1		3		1		2		2
Manheim	746			2								1		1
Dolgeville	3,139			26		7		47	1	15	5	5	3	8
Newport	627			35										
Newport, village	697			90	1									
Poland, village	315			1									1	1
Norway	597	5		12								2	1	3
Ohio	496			4										
Russia	1,225	1						1				4		4
Cold Brook, village	274											1		1
Salisbury	1,643	4	1	3						11		3		3
Schuyler	1,130			13								1		1
Stark	906													
Warren	1,288			1				6		1				
Webb	759			2						2		2	1	3
Old Forge, village	515	1		6		3		7				11		11
Wilmurt	227													
Winfield	647											1		1
West Winfield, village	788			1								2		2
Jefferson county	81,009	75	5	1,526	2	96		544	24	20	4	116	5	121
Watertown, city	26,895	36	3	255		18		408	16	8		79		79
Adams	1,708			2		1		6	1					
Adams, village	1,571	1		2				2				2		2
Alexandria	2,293	1		25										
Alexandria Bay, vil	2,062	7		234				1				2	1	3
Antwerp	1,705	1		1		1						1	1	2
Antwerp, village	1,057	2		7				1	1					
Brownville	1,181	1		11		2				1	1			
Brownville, village	885			61		2		3	1			1	1	2
Dexter, village	1,145	3		1		7		9		2	1	3		3
Glen Park, village	650			22	1			13	1			1		1
Cape Vincent	1,412			14								1		1
Cape Vincent, village	1,102	3		1						1				
Champion	1,403			25		1		1						
West Carthage, village	1,587			80		2				2	1			
Clayton	2,097	1		88		5						1		1
Clayton, village	1,879	1		283										
Ellisburg	2,274	2		1		20		1				2		2
Ellisburg, village	316					7								

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Jefferson county — *Continued*													
Belleville, village 280					2								
Mannsville, village 617													
Henderson 1,071	1						14						
Henderson, village 380	1						1						
Hounsfield 1,224	1	1	67		5		15				1		1
Sacketts Harbor, vil. 829			26				21						
Le Ray 2,053			4		1		13				2		2
Black River, village 857											1		1
Lorraine 993			15				3	1			2		2
Lyme 1,187													
Chaumont, village 682	1	1									1		1
Orleans 2,269			25		1						5	1	6
Pamelia 980			14										
Philadelphia 746											2		2
Philadelphia, village 847													
Rodman 1,167	1		1								1		1
Rutland 1,394			1									1	1
Theresa 1,007			14				9						
Theresa, village 1,053	1						16	1					
Watertown 1,179							3						
Wilna 2,522	5		59	1	5			2			2		2
Carthage, village 3,871	5		186		14				6	1	6		6
Worth 579			1		2		4						
Lewis county 25,947	7	3	52	2	14	1	13	2	11		17	1	18
Croghan 2,532	1	1			1						1		1
Croghan, village 659					1						1		1
Denmark 1,421	1	1	13										
Copenhagen, village 695											1		1
Diana 1,448	1		10	1					4		1		1
Harrisville, village 991	1		7		5	1	5		6		1		1
Greig 758							5						
Harrisburg 677													
High Market 390			1									1	1
Lewis 733			2										
Leyden 1,066			5	1									
Port Leyden, vil. 753											1		1
Lowville 860											1		1
Lowville, village 3,244	1		3				2				6		6
Lyonsdale 822			2										
Lyons Falls, vil. 863											2		2
Martinsburg 1,761	2	1											
Montague 489			1				1	1			1		1
New Bremen 1,441			6		1						1		1
Osceola 467			2										
Pinckney 804													
Turin 769								1	1				
Turin, village 339													
Watson 771					6								
West Turin 803													
Constableville, village 391													
Livingston county 38,427	5	1	312	3	43		86	2	8		55	10	65
Avon 1,432			4				6				1		1
Avon, village 2,430			7		8		11	1	1		4		4
Caledonia 861			48										
Caledonia, village 1,241			54				2		1				
Conesus 1,041	1	1	4		3		2				2		2
Geneseo 1,095			2										
Geneseo, village 2,253			6										
Groveland 1,699			8	1	4						1		1
Leicester 1,506	1		1						1		1		

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)		TYPHOID FEVER		MEASLES		SCARLET FEVER		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS CASES		
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Livingston co. — (*Cont'd*)														
Leicester, village	305	1										1		1
Lima	1,196			37		8								
Lima, village	922	1		20		1						3		3
Livonia	2,142			4		5		22					1	1
Livonia, village	857			3		6		25				1		1
Mt. Morris	1,171			9				1	1					
Mt. Morris, village	3,884			33	1			1		1		2	2	4
North Dansville	272			3		1								
Dansville, village	4,018			2		1								
Nunda	1,149			19				1				1		1
Nunda, village	1,140											2		2
Ossian	666													
Portage	962			6		2		2						
Sparta	894					1		13						
Springwater	1,689	1		17		2						1		1
West Sparta	800													
York	2,802				1									
Craig Colony				25		1				4		35	7	42
Madison county	41,742	7	2	328	1	72		86	1	15	4	37	6	43
Oneida, city	9,461	1				17		1		6	2	8	1	9
Brookfield	1,930	4	1	3				8		2	1	2		2
Brookfield, village	400							8						
Cazenovia	1,939	1		14		1		6		2	1	2		2
Cazenovia, village	1,928			2		2						2		2
De Ruyter	663			1										
De Ruyter, village	604													
Eaton	1,979			69		3				2		4		
Morrisville, village	582			58	1			2						
Fenner	836													
Georgetown	989			91				2				2		2
Hamilton	1,473			5		3		7				3		3
Earlville, village	592			3				41				1		1
Hamilton, village	1,586			3		1						4		4
Lebanon	1,116			3		3		4				2		2
Lenox	1,446			6		22		1	1			1	1	2
Canastota village	3,849	1		8		5				2		1		1
Wampsville, village	222													
Lincoln	950					2				1				
Madison	1,519			4				6				1	1	2
Madison, village	317			1										
Nelson	1,230			25								1		1
Smithfield	904			7										
Stockbridge	1,544			16		3								
Sullivan	2,609			8		9						1	2	3
Chittenango	1,074		1	1		1						2	1	3
Monroe county	319,310	92	9	2,580	39	2,783	39	414	20	486	59	830	2	832
Rochester, city	250,767	72	8	2,147	36	2,432	36	380	13	423	53	778		778
Brighton	2,974			18		5		3	2	1		2		2
Chili	2,050	2		11		2								
Clarkson	1,657					4				7	2	1		1
Gates	5,498			102	1	21		4		6		14		14
Greece	8,492	3		50		65	1			6		7	1	8
Hamlin	2,458			17	1	6		3				1		1
Henrietta	2,083	2				12								
Irondequoit	4,603			18		12		1		3	1	5		5
Mendon	1,638	1		5		8								
Honeoye Falls, village	1,258			9		4								
Ogden	1,952	1				3	1							
Spencerport, village	848	1		2		2		1		1		1		1
Parma	2,451			6		10				1				
Hilton, village	817											1		1
Penfield	2,967			46		12		8		1	1	1		1
Perinton	2,104			11		3		3		3			1	1

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
(Monroe county — *Continued*)													
E. Rochester, village .. 3,471			9		53		3		10	1	3		3
Fairport, village..... 3,556	2		41	1	21		8		5		5		55
Pittsford..... 1,534			3		2						3		3
Pittsford, village..... 1,376			2		4								
Riga..... 1,257			2		5						1		1
Churchville, village... 583	1		1		5								
Rush..... 1,578	1	1	2		12								
Sweden..... 1,267	1		1		1				7	1			
Brockport, village.... 3,368	4		3		3				10		1		1
Webster..... 2,950			5		6						6		6
Webster, village..... 1,439			1										
Wheatland..... 1,414	1		16		2				2				
Scottsville, village.... 900			35		3	1							
N. Y. S. Agricultural and Indust. School.....			17		15								
Montgomery county.. 61,030	12	1	459	2	13		43	1	37	5	152	6	158
Amsterdam, city..... 34,317	7		85	1	8		34		32	3	120	1	121
Amsterdam..... 1,742			2				1			1	4		4
Fort Johnson, village.. 681									1	1		1	1
Hagaman, village..... 952			2										
Canajoharie..... 1,549			2										
Canajoharie, village... 2,474	3	1	44		1				2				
Charleston..... 898			3										
Florida..... 1,912			4						1			1	1
Glen..... 1,110			3						1				
Fultonville, village.... 955			1								2		2
Minden..... 1,706	1		2				3				3		3
Fort Plain, village.... 2,923			128		1						13	1	14
Mohawk..... 1,455			9		3		3				2		2
Fonda, village..... 1,120			11								1		1
Palatine..... 1,325			4								2		2
Nelliston, village..... 716			66								2		2
Palatine Bridge, village 408			4										
Root..... 1,327			17	1									
St. Johnsville..... 753			12								2		
St. Johnsville, village.. 2,705	1		60				2	1			1	2	3
Nassau county..... 116,825	15	1	400	10	122	1	103	8	165	17	97	15	112
Hempstead..... 32,890	10		44	2	31	1	28	5	19	2	25	5	30
East Rockaway, village 1,607			2		7				12		2		2
Floral Park, village... 1,771			4		1		11		2				
Freeport, village..... 7,463	1		16		4		4		18	1	8		8
Hempstead, village... 6,073	1		39		2				2	1	5		5
Lawrence, village..... 1,370					1				2				
Rockville Center, village..... 5,223			3		2			1	6	1	11	2	13
Cedarhurst, village.... 2,657			4		10		5		2				
Lynbrook, village..... 3,055			21		11		4		16	1	7		7
Long Beach, village... 662			1				11						
N. Hempstead..... 20,579			112	3	31		41	1	37	1	17	5	22
Mineola, village..... 2,318	1	1							1	1	1		1
Plandome, village.... 255			2						2		1		1
Sands Point, village... 535			1										
Oyster Bay..... 26,030	2		114	2	22		1	1	39	8	19	3	22
Farmingdale, village.. 1,856			10	1					4	1	1		1
Sea Cliff, village..... 1,981			27	2			1		3				
Niagara county..... 108,550	97	15	553	7	92	2	377	11	132	6	174	10	184
Lockport, city..... 18,695		6	72	1	2		62		4	2	21	4	25
Niagara Falls, city.... 42,257	17	5	236	4	44		102	5	85	4	114	2	116
N. Tonawanda, city... 13,498		2	5		19		111	4	21		16	1	17
Cambria..... 1,892	1		7								2	1	3

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)		Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Niagara county — (*Continued*)														
Hartland	2,659			2	1			8	1	1		2	1	3
Middleport, village	1,427			1		1		2		2		1		1
Lewiston	2,535	1		64		8	1	6		10				
Lewiston, village	741			4				14	1	2				
Lockport	2,077			23	1			5				4		4
Newfane	4,537					5		5		1		2		2
Niagara	336											1		1
La Salle, village	2,402			5		1				1		2		2
Pendleton	1,323					2						1		1
Porter	1,933			70						3				
Youngstown, village	571	1		1										
Royalton	3,703	1	1			4		32				2		2
Somerset	1,870			29				12		1		1		1
Barker, village	550			1				1						
Wheatfield	1,936	1	1			2	1	10				1		1
Wilson	2,475	3		5		3		7				1	1	2
Wilson, village	741					1				1				
Indian Reservation	394													
Oneida county	167,331	127	18	1,237	29	160	1	233	15	118	19	205	13	218
Rome State Custodial Asylum												52		52
Rome, city	21,926	14	3	451	11	23		7		21	3	60	1	61
Utica State Hospital		1												
Utica, city	80,589	78	11	146	6	66	1	71	12	56	10	26		26
Sherrill, city	1,415			1		6		12		1				
Annsville	1 450				2					1		2		2
Augusta	1,083									1				
Oriskany Falls village	973	1		4						4				
Ava	659			2								1		1
Boonville	1,351			15								1		
Boonville village	1,909	2		39	2							1		
Bridgewater	604	1		1				3						
Bridgewater, village	258			1										
Camden	1,178			34	1									
Camden, village	2,181	2		55		2							1	1
Deerfield	1,836	1		17	2									
Florence	970			2	1									
Floyd	702			1						1		1		1
Forestport	665			3		1						1		1
Forestport, village	505			50									2	2
Kirkland	3,517	4	1	4		5		6				3		3
Clinton, village	1,264	1	1	1		2		4		1		2	2	4
Lee	1,313	2		38	1									
Marcy	1,260	1		13		1		2		3	1	1		1
Marshall	1,543			5		1		2				3		3
Waterville, village	1,564	1		2		1		19				1		1
New Hartford	6,405	9	1	58		10				3	1	15		15
New Hartford, village	1,459					1				5		2		2
Paris	2,046	1		9				27		2				
Clayville, village	972							10	3			1		1
Remsen	566			30								1		1
Remsen, village	417											1		1
Sangerfield	739			2		2				1		1		1
Steuben	839			10										
Trenton	1,677	3		12	1			3				1	1	2
Holland Patent, village	339													
Prospect, village	339	1		2								1	1	2
Trenton, village	316			1								2		2
Vernon	1,495			1		1		30		1				
Oneida Castle, village	399							1						
Vernon, village	532			4				22						
Verona	3,752	1		32		15		4		1				
Vienna	1,931	1	1			4		1		5	1	1		1
Western	1,150			17		1								
Westmoreland	2,115			8				4		2		2		
Whitestown	4,459			98	2	4				6	3	16	1	1

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	TYPHOID FEVER		MEASLES		SCARLET FEVER		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS CASES		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Oneida county—(*Continued*)													
Whitesboro, village... 2,493			48		5		4		1		1		1
Yorkville, village..... 1,086	2		14		2		1		1		5	3	8
Oriskany, village..... 1,090			5		7				1			1	1
Onondaga county..... 213,992	75	17	1,911	22	1,057	14	44	11	497	42	308	7	315
Syracuse, city..... 145,293	26	10	1,468	15	747	11	19	10	427	32	237		237
Institution for Feeble Minded Children													
Camillus..... 2,191	2		4		2				1			1	1
Camillus, village..... 840			3		3				3				
Cicero..... 2,689			9		27				1		1		1
Clay..... 2,661			3		5						1		1
De Witt..... 4,190			7		1		1	1	3	1	7		7
East Syracuse, village. 3,839			19		14				5	1	6		6
Eastwood, village..... 777			1		1				8				
Elbridge..... 1,501	1		2		3						1		1
Elbridge, village..... 475					2								
Jordan, village..... 1,063	1		1		2								
Fabius..... 1,230					2					1			
Fabius, village..... 340					7								
Geddes..... 853			3	1		1			2		1		1
Solvay, village..... 5,886	3	2	29		42				4	1	5		5
La Fayette..... 1,447			8	1	4				3	2	5		5
Lysander..... 2,746	3	1	76	2	2				2				
Baldwinsville, village.. 3,220			30		22				13		1	1	2
Manlius..... 2,550			10		57		7		1		5	2	7
Fayetteville, village... 1,779			13		16		11					1	1
Manlius, village..... 1,304	1		2		23	1			1		3		3
Minoa, village..... 668	1				3								
Marcellus..... 1,936			5		9				2	1	2		2
Marcellus, village..... 991			7		3						2		2
Onondaga..... 6,267	2	1	14		32	1			7	1	17		17
Otisco..... 1,058			1		1		2		5		1		1
Pompey..... 2,344	6		35		8		4		1	1	3		3
Salina..... 2,367	5		13	2	7				2	1	1		1
Liverpool, village..... 1,591			28						2		1		1
Skaneateles..... 2,851	22	3	6		3				2		2	1	3
Skaneateles, village... 1,768	1		4		3				1		1	1	2
Spafford..... 1,082			14		2								
Tully..... 1,015			46	1							1		1
Tully, village..... 559			18								1		1
Van Buren..... 2,034	1		32		4				1		3		3
Indian Reservation... 537													
Ontario county.....	49	4	80		60	1	81	1	13	1	60	7	67
Canandaigua, city.... 7,501	2	1	3		16				2		8		8
Geneva, city..... 13,232	28	2	11		7	1	5		2		20		20
Bristol..... 1,143	2	1			5								
Canadice..... 556							6						
Canandaigua..... 2,140	1		2		2				1		3		3
East Bloomfield..... 1,975			6		14				3		1		1
Farmington..... 1,585	1		21		3		3		1		1	1	2
Geneva..... 1,386	1		1				2				3		3
Gorham..... 1,986											2		2
Rushville, village..... 128	1												
Hopewell..... 1,416					1		2						
Manchester..... 1,828	1							1					
Clifton Springs, village 1,664			3				1				5	2	7
Manchester, village... 1,115	2										1		1
Shortsville, village.... 1,228			4				5		2	1	3		3
Naples..... 1,147	1		4								1		1
Naples, village..... 1,138	4		1				1				1	1	2
Phelps..... 3,092					1		4				3	1	4
Phelps, village..... 1,375	1				1						2	1	3
Richmond..... 1,208	1				1						2		2
Seneca..... 3,001	3		1		1		5		1		1		1
South Bristol..... 964												1	1

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Ontario county — (*Continued*)													
Victor 1,566			10		3		22				2		2
Victor, village 1,051			13		3		20		1				
West Bloomfield 1,203					2						1		1
Orange county 118,118	32	6	1,311	5	140	2	156	6	167	14	196	15	211
Middletown, city 16,331	1	1	105	2	10		8	1	22	2	22	2	24
Newburgh, city 27,876	5		684	3	19				50	8	50		50
Port Jervis, city 9,413	2		11		20		27	1	3		15	4	19
Middletown State Hospital	1		9								29	5	34
Blooming Grove 1,431							1				1		1
Washingtonville, village 635	1	1	1										
Chester 855			17		2		12				1		1
Chester, village 1,280	2		26		2		1	2	3		2		2
Cornwall 2,870	1		2		2				5				
Cornwall, village 2,240			11								1		1
Crawford 1,693			9				4				5		5
Deerpark 1,753			8		4				2		2		2
Goshen 1,799	1		37						1		4		4
Goshen, village 3,511			32										
Greenville 836			1										
Hamptonburg 1,184	1		70		1		1						
Highlands 1,536			2		2				3		1		1
Highland Falls, village 2,518	3		2		2		1		34	1	4		4
Minisink 1,018			2		1						1		1
Unionville, village 387					6								
Monroe 515									1		1		1
Monroe, village 1,519													
Harriman, village 854							7	1	2	1			
Montgomery 1,864	1		9		1				1	1	1		1
Montgomery, village 957			27								1		1
Walden, village 5,196	1		10		24	1	1		2		6		6
Mt. Hope 1,589			2				82		15		11	1	12
Newburgh 4,807	1		15		1				5		8		8
New Windsor 2,745			8		1				6		4	1	5
Tuxedo 3,636	2	1	15		1				2	1			
Wallkill 2,803	1		48		1				2		4		4
Warwick 5,603	3	1	36		23	1	7	1	7		9	2	11
Warwick, village 2,505	2	1	75		17		4				2		2
Wawayanda 1,954			12						1		1		1
Woodbury 2,300	3	1	3								1		1
Orleans county 33,919	15	1	179	1	64		1	1	8	1	29	3	32
Albion 1,393	1												
Albion, village 5,988			2		6				1		8	1	9
Barre 1,875													
Carlton 2,289			26										
Clarendon 1,373			11		1						3		3
Gaines 1,853			1		2								
Kendall 1,678			15		2						2		2
Murray 2,441	4		27		4						7		7
Holley, village 1,780	3		20	1	9						4		4
Ridgeway 2,881	3	1	11		4		1	1				1	1
Medina, village 6,079	2		1		28				7	1	3		3
Shelby 2,001					8						2	1	3
Yates 1,456	2		35										
Lyndonville, village 832			30										
Oswego county 75,929	29	1	502	2	127		135	8	62	7	87	2	89
Fulton, city 11,138	2		317		47		8		43	4	21	1	22
Oswego, city 25,426	12	1	16	1	16		6	1	6	2	24		24
Albion 1,120	2		30		2		16				1		1
Altmar, village 390			14		2		5						
Amboy 670			1								2		2
Boylston 578			1								1		1
Constantia 1,463					2		4						
Cleveland, village 660							3	1					

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Oswego county — (*Continued*)													
Granby	1,928	2	15	1	2		5	1	2		3		3
Hannibal	1,902		2				3		2				
Hannibal, village	432												
Hastings	1,880	1	10								1		1
Central Square, village	481		11										
Mexico	1,675		9		8		12		1		4		4
Mexico, village	1,474	1	4		13		14	1			1		1
New Haven	1,476	1			12		15				2		2
Orwell	924	1	1				4						
Oswego	2,086	1					2				6		6
Palermo	1,281		22		2				1		1		1
Parish	871	1	4				1						
Parish, village	521	1	2		2		1				2		2
Redfield	678	1									1		1
Richland	2,060		3				23	2	1		2		2
Pulaski, village	1,860				6		3	2	2		2		2
Sandy Creek	1,181						8				2		2
Lacona, village	476				1						2		2
Sandy Creek, village	669				1								
Schroeppel	1,494										2	1	3
Phoenix, village	1,655										3		3
Scriba	2,260	1	1		1						1		1
Volney	2,420	1	12		6		2				1		1
West Monroe	935	1	2						4	1	2		2
Williamstown	861		23		4								
Minetto	1,004		2										
Otsego county	48,534	28	4	317	1	37		232	3	20		18	5	23
Oneonta, city	10,474	4	1	7	1	7		9	1	7		3	2	5
Burlington	1,145			14		9						1		1
Butternuts	1,088			2		1								
Gilbertsville, village	451													
Cherry Valley	782	1		3				3						
Cherry Valley village	762					1		12				1		1
Decatur	437			14				1						
Edmeston	1,682			5				6						
Exeter	967			16						5				
Hartwick	1,943	2		10		1		50				2	1	3
Laurens	1,046			2				10	1			1		1
Laurens, village	364			1				16						
Maryland	1,194			7		4		7						
Schenevus, village	537			9				1						
Middlefield	1,671	3	1			2						1		1
Milford	1,283			9								1		1
Milford, village	530			1									1	1
Morris	901													
Morris, village	466													
New Lisbon	976			2										
Oneonta	1,527	3		13		1		1		1		1		1
Otego	942	1		8		1						1		1
Otego, village	579	5		4				3						
Otsego	1,847			1						1			1	1
Cooperstown, village	2,634	2	1	26				2		4				
Pittsfield	965			43										
Plainfield	873	1		3				3				1		1
Richfield	796			16				1						
Richfield Spgs., village	1,623			5						1				
Roseboom	867													
Springfield	1,506			68		6								
Unadilla	1,332			4						1				
Unadilla, village	1,125	1				2						2		2
Westford	773	3		3		1		6						
Worcester	2,416	2	1	21		1		101	1			3		3

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)		TYPHOID FEVER		MEASLES		SCARLET FEVER		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS CASES		
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Putnam county	12,767	2		77		44		89	1	39	1	20	2	22
Carmel	2,737			7		12		3		6		4		4
Kent	854	1								5		1		1
Patterson	1,451			1		5				3	1	1		1
Phillipstown	1,657					11		50		11		4		4
Cold Spring, village	935			64		2		25		7		5		5
Nelsonville, village	979			2		1		9		5		1	1	2
Putnam Valley	992	1		2		13		2	1			1	1	2
Southeast	1,760									2		3		3
Brewster, village	1,402			1										
Rensselaer county	121,330	123	23	1,454	15	254	3	316	22	154	20	250	4	254
Rensselaer, city	11,210	10	1	2		25	1	1		27	1	10		10
Troy, city	75,488	86	21	1,152	13	196	1	180	16	98	17	204	1	205
Berlin	1,480			5				37		1		3		3
Brunswick	3,010	6		42		8		3		5		4		4
East Greenbush	1,559	1		2		2				1		1		1
Grafton	948			46		1		8	1	1		1		1
Hoosick	2,597	4		7		5	1	7	1	4		6		6
Hoosick Falls, village	5,406	3		27		8		5	2	5	1	7	1	8
Nassau	1,608			4						1	1	1		1
Nassau, village	597												1	1
North Greenbush	1,383	4	1	31		3				8		1		1
Petersburg	1,238	1		75	1			7				1		1
Pittstown	2,092	5		7				32				1		1
Valley Falls, village	795	1						17	1			3		3
Poestenkill	1,134			1		3						1		1
Sandlake	2,140			22		1								
Schaghticoke	1,917	1		4								1		1
Schaghticoke, village	794											1	1	2
Schodack	3,064	1		6		2		4	1	2		1		1
Castleton, village	1,533											3		3
Stephentown	1,287			21	1			15		1				
Rockland county	46,993	16	6	148	5	57	1	41	3	68	8	93	13	106
Clarkstown	7,289	4		56	1	9		2	1	7	2	10	1	11
Upper Nyack, village	642	1		1									1	1
Haverstraw	1,518			6		1						1		1
Haverstraw, village	5,418			17		6		2		4	1	10		10
W. Haverstraw, village	2,330	2	1	23		6	1	5		1		7	2	9
Orangetown	5,544			22	4	15		3	1	17	1	12	2	14
Grand View on Hudson, village	335											1		1
Nyack, village	4,291	1		1		9		1		5	1	12	2	14
Piermont, village	1,481			1		1			1			2	1	3
South Nyack, village	1,959			2						5	1	2		2
Ramapo	5,782			6		5				7	1	18	1	19
Hillburn, village	1,017			1						1		1		1
Spring Valley, village	2,804			6						5	1	7		7
Suffern, village	2,781	7	4	5		1		26		10		5		5
Stony Point	3,721	1	1	1		4		2		6		4	1	5
Letchworth Village												1	1	2
Hosp. for Deformed and Crippled Children													1	1
St. Lawrence county	90,291	83	10	403	8	23	1	255	7	80	6	103	20	128
Ogdensburg, city	14,338	3	2	30	2					14	2	9	2	11
St. Lawrence State Hospital		17	3									17	2	19
Brasher	2,270	2	1	2				6			1	3	1	4
Canton	3,779	1		18						1		2	1	3
Canton, village	2,624	1		43				2					1	1
Rensselaer Falls, village	374	1		36								1		1
Clare	358	2		2										
Clifton	1,423									8			1	1

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	TYPHOID FEVER		MEASLES		SCARLET-FEVER		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS CASES		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
St. Lawrence county — *Cont'd*													
Colton 1,362							9				2		2
De Kalb 2,479			6										
Richville, village 316			2										
Depeyster 911			35				2						
Edwards 803			2				5		5				
Edwards, village 504	3						7		6		1		1
Fine 1,579			29		9		53	1	4		3		3
Fowler 1,493											2		2
Gouverneur 1,852	2		15	1				1			3		3
Gouverneur, village 4,164	1		2		2		16	1	1		6		6
Hammond 1,267									1				
Hammond, village 418			1	1									
Hermon 988	1						3		7				
Hermon, village 607									12		1		1
Hopkinton 1,511	1		5				3		1		1		1
Lawrence 1,782	1		42								3	1	4
Lisbon 3,120	2		6	1							1		1
Louisville 1,476	1	1			5		7		1		1		1
Macomb 1,204	1		9								3		3
Madrid 1,471			5	1	1		8				3		3
Massena 2,476	8	1	2		1			1	1		4		4
Massena, village 4,614	19	1	7	1			35	1	4		7	4	11
Morristown 1,206	1		3				1				2		2
Morristown, village 479			15				1						
Norfolk 2,770	1						20				9		9
Norwood, village 1,879			6		3	1	10		1		8	1	9
Oswegatchie 1,837			16	1			16			1	2		2
Heuvelton, village 556			2										
Parishville 1,678							21				2		2
Piercefield 1,303	1						1				2	1	3
Pierrepont 1,579			1				23		4	1			
Pitcairn 755			4		5				1				
Potsdam 3,132							1	1			2	3	5
Potsdam, village 4,157	10	1					1	1			3	2	5
Rossie 932	1	1											
Russell 1,806	2		38						1		2		2
Stockholm 2,655			3				4						
Waddington 1,178			18								2		2
Waddington, village 726										1	1		1
Saratoga county 62,982	76	10	357	1	36		65	1	120	7	88	8	96
Saratoga Springs, city 13,792	8	1	19		16		11		8		29	4	33
Mechanicville, city 8,208	37	4	18		8		2		5	1	9	1	10
Ballston 1,896			31						1		1		1
Ballston Spa, village 4,344	4		95	1			20		76	2	6		6
Charlton 1,080	1		12		1						5		5
Clifton Park 2,391	3		9				17	1	2				
Corinth 246	1								2				
Corinth, village 2,415									1	1			
Day 541													
Edinburg 785													
Galway 1,174			16						3		1		1
Galway, village 104			3										
Greenfield 1,642	1	1	1		1		4				4		4
Hadley 689													
Halfmoon 1,213	3	2	27		1						3	1	4
Malta 1,298			15						1		2	1	3
Milton 1,926	8	1	6		2				4		1		1
Moreau 1,134			3						1		1		1
South Glens Falls, village 2,106	4	1	18		2				4	1	3		3
Northumberland 1,120			3										
Providence 512			1						3	1	1		1
Saratoga 1,446			2				1		1		2		2
Schuylerville, village 1,711	1		2								3		3
Victory Mills, village 657											1		1

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)		Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Saratoga co. — *Continued*														
Stillwater	2,934	1		3		1				3	1	5		5
Stillwater, village	1,041	2		6						2		1		1
Waterford	2,440	1		36		1		4		2		4		4
Waterford, village	3,047	1		31		1		6				5	1	6
Wilton	1,090					2				1		1		1
Schenectady county	98,625	48	5	2,158	10	123	2	247	5	105	8	183	4	187
Schenectady, city	80,381	39	5	1,762	8	97	1	227	5	97	7	173	1	174
Duanesburg	2,280			69		8	1	3				1		1
Glenville	2,748			36		2						1		1
Scotia, village	3,790	7		68		3		2		1		3	1	4
Niskayuna	2,607	1		71		5		13				2	1	3
Princetown	621												1	1
Rotterdam	6,193	1		152	2	8		2		7	1	3		3
Schoharie county	23,005	10	1	123		19		117	1	6		33	1	34
Blenheim	530			1								2		2
Broome	756			5		1						1		1
Carlisle	963			2								2		2
Cobleskill	1,508	1		24		1		4		1		2		2
Cobleskill, village	2,362	3		56		12		23				2		2
Conesville	681			1				3						
Esperance	729							4		1		1		1
Esperance, village	241			1				3		1		1		1
Fulton	1,350									1		2		2
Gilboa	1,420			10				30						
Jefferson	1,181			8				20	1			2		2
Middleburg	1,194					1								
Middleburg, village	1,059					4						3		3
Richmondville	893			3		1		5				6		6
Richmondville, village	567	2		1						2				
Schoharie	1,314	1	1									3	1	4
Schoharie, village	1,124	1		1								2		2
Seward	1,380			3				2						
Sharon	1,250							1				1		1
Sharon Springs, village	531							1				1		1
Summit	1,046	1						17				1		1
Wright	926	1		4								1		1
Schuyler county	13,954	7	1	110		27		89	2	2		10	1	11
Catharine	857			1		6								
Odessa, village	335					2								
Cayuta	346	1		14										
Dix	1,154			31		2		2						
Watkins, village	2,760	3	1	8		5		73	2			3		3
Hector	3,173	2				5		11				4	1	5
Burdett, village	375													
Montour	395	1				1								
Montour Falls, village	1,281			11		4				1		2		2
Orange	982			38		1								
Reading	1,039					1		3						
Tyrone	1,257			7						1		1		1
Seneca county	25,249	15	3	184		28		9		18	3	125	5	130
Covert	1,200			2		2						2		2
Interlaken, village	663											1		1
Fayette	1,986	1		2				1		1		3		3
Waterloo, village	4,343	2								1				
Junius	942					1								
Lodi	1,393			6				6				2		2
Ovid	1,153		1			9				1		1		1
Ovid, village	591	3	1											
Romulus	2,098	3	1	14						3		2		2
Seneca Falls	613			2								2		2
Seneca Falls, village	7,018	1		146		15				9	3	6		6

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Seneca county — *Continued*													
Tyre 895													
Varick 1,273			10		1		2				1		1
Waterloo 1,075	1		2										
Willard State Hospital	4								3		105	5	110
Steuben county 83,630	49	10	1,069	1	57	2	423	7	229	16	53	10	63
Corning, city 13,459	14	4	22		15	1	15		94	3	13	3	16
Hornell, city 14,352	3		411		23	1	158	2	72	3	8		8
Addison 406							8	1					
Addison, village 1,754	2						35					1	1
Avoca 1,025			3										
Avoca, village 1,083	1		4					1	1		1	1	2
Bath 3,428			2		1		4		3		2		2
Bath, village 4,173	4		9				9		14	2	3		3
Savona, village 571			6										
Bradford 629	1												
Cameron 957			5		4		7						
Campbell 1,106													
Canisteo 1,080			2										
Canisteo, village 2,314	1	1	18				19	1	3	1	2	1	3
Caton 1,053			4		1				6		1		1
Cohocton 2,145			100						3		1		1
Cohocton, village 958			11				5						
Corning 2,580	6	1	3		3				13	2	1		1
Dansville 1,269	8				36								
Erwin 1,150	2		7		2						1		1
Painted Post, village 1,319	6	1	2		1				6	1			
Fremont 812			9				16		1				
Greenwood 1,142			4										
Hartsville 638			1						1				
Hornby 842													
Hornellsville 1,515			20				17	1	6	1	2		2
Arkport, village 538	2		8				23						
Howard 1,386			1				1	1			1		1
Jasper 1,253			9		1		8						
Lindley 1,181	5												
Prattsburg 1,102												1	1
Prattsburg, village 696												1	1
Pulteney 1,335			13		1		2				1		1
Rathbone 869			1				6						
Thurston 855													
Troupsburg 1,532			4				5						
Tuscarora 955	1						20		1				
Urbana 1,536			56				11			1	1	1	2
Hammondsport, village 1,560			163				13		3	1	1		1
Wayland 1,400	1		46		1		4						
Wayland, village 1,699			83	1	4				2	1			
Wayne 686			32								1		1
West Union 885			2				1						
Wheeler 892													
Woodhull 1,158											1		1
Woodhull, village 352													
Soldiers' and Sailors' Home											12	1	13
Suffolk county 104,342	130	7	928	7	89	1	198	5	106	13	302	15	317
Babylon 5,310	1		5				1		12	2	9		9
Amityville, village 2,780			1						1		2	1	3
Babylon, village 3,100			7		1						1		1
Brookhaven 14,435	5	1	120	1	12	1	17		9	2	28	1	29
Bellport, village 499			1		2								
Patchogue, village 4,506			95		1		5		3	2	10	1	11
Shoreham, village 151													
Easthampton 4,018	1		110	1	2		13		8		2	2	4
Sag Harbor, village 3,245	1		124		6		6		1		3		3
Huntington 12,717	8	1	6	4	3			1	22	1	10	1	11

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)		TYPHOID FEVER		MEASLES		SCARLET FEVER		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS CASES		
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Suffolk county — *Continued*														
Northport, village	2,527	1		1		2				1	1			
Islip	17,414	1	1	48		10		16	1	14	1	32	4	36
Brightwaters, village	244													
Riverhead	5,730			15		4		14	1	7		8	1	9
Shelter Island	1,155							2		2				
Smithtown	4,988	94	1	5		5				1		11	2	13
Southampton	8,262	1		216		11		75		5		7		7
Southampton, village	3,092	2	1	151		16		49	2			8		8
Southold	6,273			18	1	9				4		1		1
Greenport, village	3,735			3		3				16	4	6		6
Indian Reservation	161													
Central Islip State Hospital		10	2	1		1						73		73
Kings Park State Hospital		5		1		1						91	2	93
Sullivan county	38,189	15	2	441		21	1	168	2	12		1,162	67	1229
Bethel	2,308	1		13		2		7				7		7
Callicoon	2,066	3		32		2		11		4		9		9
Cochecton	1,141	1	1	10				41				29	2	31
Delaware	1,915			105				10	1			3		3
Fallsburgh	4,860	1		11		3		18				45	4	49
Centerville Station, village	900											1		1
Forestburg	429			1								1		1
Fremont	1,771			6				13				5		5
Highland	1,043	2	1	1								3		3
Liberty	3,944	1		37		1		32		1		433	12	445
Liberty, village	2,395			74		1		13		1		396	41	437
Lumberland	806			2										
Mamakating	2,695			34		1		2		2		4		4
Wurtsboro, village	409					1								
Neversink	1,861	2		26				1	1			10	1	11
Rockland	3,803	3		64		6	1	11		2		20		20
Thompson	2,810			9		4		7		2		98	1	99
Monticello, village	2,132	1		3				2				98	6	104
Tusten	901			13										
Tioga county	25,549	16	5	336	5	37	1	58	2	36	7	19	2	21
Barton	1,523			5	1	1						1		1
Waverly, village	5,159	7	1	14		1		3	1	10	1	4		4
Berkshire	875			26								1		1
Candor	2,147	2	2	7		1				7	1	1	1	2
Candor, village	749	1		4									1	1
Newark Valley	1,167			11	1	3		5	1			1		1
Newark Valley, village	808			62	1			30						
Nichols	947			3								1		1
Nichols, village	586													
Owego	2,896			41	1	7		10		5	1	2		2
Owego, village	4,570	3	1	50	1	16	1			12	3	4		4
Richford	913	1		13		1				2	1			
Spencer	552	2	1			1						1		1
Spencer, village	653							5						
Tioga	2,004			100		6		5				2		2
Tompkins county	36,535	23	5	148	1	14		85	1	7		78	7	85
Ithaca, city	16,750	18	3	20		9		26		3		51	4	55
Caroline	1,676	1		15		1		5						
Danby	1,230			5						1		1		1
Dryden	2,497			30				1				1		1
Dryden, village	722			3								1		1
Freeville, village	337			8				4				2		2
Enfield	1,057	1										1		1
Groton	2,056	1	1	18				9				2		2
Groton, village	1,445			27		1		30				4		4
Ithaca	1,756	1		9	1			8	1	3		1		1

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	TYPHOID FEVER		MEASLES		SCARLET FEVER		WHOOPING COUGH		DIPHTHERIA		TUBERCULOSIS CASES		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Tompkins county — *Continued*													
Cayuga Heights, village 137													
Lansing 2,612			1		3						4		6
Newfield 1,306			2								1		1
Newfield, village 341													
Ulysses 1,432			8				1				5		5
Trumansburg, village 1,181	1	1	2				1				4	1	5
Ulster county 85,367	66	9	194	2	55		122	7	43	5	125	2	127
Kingston, city 26,354	31	3	49		16		4	2	18	2	33	1	34
Denning 551			1										
Esopus 4,297	10		3		5				2	1	7		7
Rifton, village 346										1			
Gardiner 1,328			38								2		2
Hardenburg 555			4										
Hurley 1,189	2										1		1
Kingston 323	1							1					
Lloyd 2,865	1	1	1		11		2	2	3	1	4		4
Marbletown 2,709	1		7								1		1
Marlborough 3,513	1		3		6				4		3		3
Marlboro, village 795			2		2						2		2
New Paltz 1,308	1	1			1						2		2
New Paltz, village 1,261	1	1	1								5		5
Olive 2,921	5		1								4		4
Plattekill 1,928			2				1				4		4
Rochester 2,715	5	2	9		1		9		1		8		8
Rosendale 2,082			8								3		3
Rosendale, village 804	1		1										
Saugerties 5,366	4	1	8				30	1	3		12		12
Saugerties, village 4,490	1		7		6		53	1	2		12	1	13
Shandaken 2,090			14		2				4		1		1
Pine Hill, village 646													
Shawangunk 2,392			11						1		3		3
Ulster 3,437	1		2										
Wawarsing 4,434			4	1	3		6		1		10		10
Ellenville, village 3,073	1		16	1			12				7		7
Woodstock 1,605	1		2		2				4		1		1
Warren county 32,977	20	3	207		66	1	82	1	59	5	57	7	64
Glens Falls, city 16,323	9	2	174		54	1	29		43	3	40	5	45
Bolton 1,397			15		2								
Caldwell 892	1		2				9						
Lake George, village 755									1		3		3
Chester 1,630	5								1		3		3
Hague 943			1						1				
Horicon 1,053	1								4	1			
Johnsburg 2,353	2										5		5
Luzerne 1,670			1						2			1	1
Queensbury 2,721			11		10		6	1	2		2		2
Stony Creek 719			1				19				2		2
Thurman 807									2				
Warrensburg 2,311	2	1	2				19		3	1	2	1	3
Washington county 46,955	26	4	298	3	123		128	1	101	6	49	1	50
Argyle 1,451	1		2		7		2						
Argyle, village 223									1	1			
Cambridge 1,179			1		2		5						
Cambridge, village 1,727			1	1			31				6		6
Dresden 514									1				
Easton 1,831	1				2								
Greenwich, village 2,315			2		2				1		1		1
Fort Ann 1,866		1	22		14						2		2
Fort Ann, village 436	2	1	25		17								
Fort Edward 2,069	2		2		37		22		3		2		2
Fort Edward, village 3,662	1		4		12		3		5		7	1	8
Granville 2,491									3		2		2
Granville, village 3,890	10	1	47		8		13		53	1	7		7

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Washington co. — *Continued*													
Greenwich 2,293			1		2				4	2	4		4
Hampton 671													
Hartford 1,171			21		3						1		1
Hebron 1,356			1										
Jackson 988			7				7		1		1		1
Kingsbury 1,703			8						6				
Hudson Falls, village 5,585	2		1		17		1		5		4		4
Putnam 579			5										
Salem 1,377			76		1		24				2		2
Salem, village 1,096			11				1				2		2
White Creek 1,020			12				18				1		1
Whitehall 796	1		13	2									
Whitehall, village 4,666	4	1	35		2		1	1	18	2	7		7
Wayne county 53,476	43	2	765	5	117		397	5	22	1	72	18	90
Arcadia 1,716	5	1	2				9				5	3	8
Newark, village 6,468	1		19		1		10		1	1	7	5	12
Butler 1,558	1		30	1	2		13					1	1
Wolcott, village 1,346			113		1		14				3	1	4
Galen 1,944			58		6		9				3		3
Clyde, village 2,699	1		139		50		8	1	2		3		3
Huron 1,681	5		58				40		1				
Lyons 1,453	12	1	5					1			1		1
Lyons, village 4,742	5		46	2	2						5		5
Macedon 1,336	4		10		6		2	1					
Macedon, village 1,147					2						1		1
Marion 2,435	5		2		1		11		2		1		1
Ontario 2,934	1		66		3		12		6		8	1	9
Palmyra 1,728			1	1	4		2				4		4
Palmyra, village 2,469	1		1		4		12				1	1	2
Rose 2,243			14		1		32				2	1	3
Savannah 1,108			12				16		2		2		2
Savannah, village 531			8		1		1		2		5		5
Sodus 5,757	1		3		2		32				4		4
Walworth 2,308			72		15		73		2		1		1
Williamson 3,762			2		4		73		3		12	2	14
Wolcott 1,576	1		38	1	4		8	1					
Red Creek, village 525			66		8		20	1					
N. Y. State Custodial Asylum									1		4	3	7
Westchester county 321,713	87	16	2,137	9	459	7	1,223	22	626	48	430	37	467
Peekskill, village 15,502	2		125		12		153	1	40		30	7	37
White Plains, city 19,287	5		184	1	23		41		27	3	25		25
Mount Vernon, city 37,583	20	4	318	3	80		257	2	98	2	32	4	36
New Rochelle, city 31,758	6	1	238		30		84	2	20	1	34	1	35
Ossining, village 10,326	3		36		9	1	22		10	2	18	2	20
Port Chester, village 15,129	6		87		11		53	4	17	2	22	4	26
Yonkers, city 90,948	16	6	549	1	223	6	105	6	276	24	123		123
Sing Sing Prison											7		7
Bedford 4,777			16		1		58		2	1	3	1	4
Mount Kisco, village 2,902	2	1	5				118				4		4
Cortlandt 5,045			25				20		24	1	9	3	12
Croton-on-Hudson, vil. 2,243			1		1		4		1		1		1
East Chester 2,565			4		1		1		6	1	4		4
Bronxville, village 2,245	1		23		1		19		1		1		1
Tuckahoe, village 2,753	2	1	12		3		11		45	3	8		8
Greenburgh 4,016	2		18		8		1		3		8	1	9
Ardsley, village 442							1		1		1		1
Dobbs Ferry, village 4,030	1		2		9				4	1	4		4
Hastings-on-Hudson, village 5,461	3	1	51		4		8		2		15	1	16
Irvington, village 2,379			2		2				3		5		5
Tarrytown, village 5,752			5		3		28	1			8		8
Elmsford, village 1,330	2		3		2						2	1	3
Harrison 5,081	2		8		8		28	1	2		5	2	7

Table 16

COMMUNICABLE DISEASES, CASES AND DEATHS, 1917, BY CITIES, VILLAGES AND TOWNS — (*Continued*)

DISTRICT (Population June 15, 1915)	Typhoid Fever		Measles		Scarlet Fever		Whooping Cough		Diphtheria		Tuberculosis Cases		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Pulmonary	Other forms	Total
Westchester county — *Con.*													
Lewisboro 1,507			4				5				1	1	2
Mamaroneck 1,339			10		2		8	1			2	1	3
Larchmont, village 2,060			23		2		24					1	1
Mamaroneck, village 7,290	7	1	127	2	2		77	2	20		13	2	15
Mount Pleasant 5,596			4		3		7		3		5	1	6
Briarcliff Manor, vil. 1,221	1		10		3		1		1		1		1
North Tarrytown, vil. 4,877			15	1	3		12		4	2	4		4
Pleasantville, village 2,464			11		1		9		1		6		6
Newcastle 2,528	1		12		1		4			1	3		3
North Castle 2,484			3				4		5	1	3	1	4
North Salem 1,181			25				5		2		2	1	3
Ossining 673	1		3		2						1		1
Pelham													
North Pelham, village 1,874			21				11		1	1	2		2
Pelham, village 793			52				8						
Pelham Manor, village 1,115			30								3		3
Poundridge 643								1			1		1
Rye 809			2				3						
Rye, village 5,339	1		35		8		12	1	4	2	5		5
Scarsdale													
Scarsdale, village 2,717	3	1	21		1		7				1		1
Somers 1,173			12	1			4				3	1	4
Yorktown 2,431			5				10		9		5	1	6
Wyoming county 33,028	2		92		18		85		8	2	24	5	29
Arcade 911					5								
Arcade, village 1,568					1		2		3	1			
Attica 898													
Attica, village 2,013													
Bennington 1,757							3				2		2
Castile 1,193			7				2				1		1
Castile, village 962			1				1						
Perry, village 5,009					3		53		1		5		5
Covington 981					2						3		3
Eagle 1,189			2										
Gainesville 1,242			1										
Gainesville, village 340					1						1		1
Silver Springs, village 893			40				1		2	1		1	1
Genesee Falls 661			1								1		1
Java 1,636							3						
Middlebury 1,093			1				2						
Wyoming, village 392													
Orangeville 905			3				1				1		1
Perry 1,117	1		1										
Pike 732							3				1		1
Pike, village 344			3				7				1		1
Sheldon 1,752			25								1		1
Warsaw 1,121					1								
Warsaw, village 3,424	1		6		5		7		2		7	4	11
Wethersfield 895			1										
Yates county 18,841	24		19		3		94	1	12	2	11	2	13
Barrington 1,017			2						1				
Benton 1,856	2				2		11		2		1		1
Penn Yan, village 4,725	8		2		1		69	1	3		3	1	4
Italy 823			1								1		1
Jerusalem 2,424	2						12		2	1	3		3
Middlesex 1,133	4		3										
Milo 1,723	2		3								1	1	2
Potter 1,083	1								1	1			
Rushville, village 331							1						
Starkey 1,420	1		5						1				
Dundee, village 1,236	1		3				1		2		1		1
Torrey 744	1										1		1
Dresden, village 326	2												

DIVISION OF LABORATORIES AND RESEARCH

DIVISION OF LABORATORIES AND RESEARCH

HERMANN M. BIGGS, M. D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR.— I have the honor to submit the following report of the work of the Division of Laboratories and Research for the year 1917.

During the year the organization of the work of the laboratory which was begun in 1914 has approached fulfillment. Attention was directed afresh at the beginning of the year to the ideas and aims formulated in 1914, and especially to the need of extending the work to meet the demands of health officers and physicians throughout the State. The work was proceeding, when suddenly war was declared, followed by all the disorganization and stress which it has occasioned. Thus the year 1917, while showing progress along lines originally laid out and in the research problems already started, is characterized chiefly by the development of many new and important interests and activities.

The main work of the laboratory falls naturally under two distinct heads: the examination of specimens and samples for diagnosis and report, and the preparation of antitoxins, serums, vaccines and other products for prophylactic and therapeutic use in the prevention and cure of disease and in the control and spread of epidemics. Other branches and phases of the laboratory work are closely related to these main activities, but they are of sufficient importance to receive separate consideration.

Examinations of specimens for diagnosis and report

Bacterial diagnosis. The number of routine and special examinations which have been made in the bacterial diagnosis of communicable and other diseases has increased steadily each year. The rate of increase as shown in the tables on page 271 for the year 1917 corresponds to that shown in previous years. The most

marked and striking increase in the work as a whole is in connection with the extension of the scope of the work to include the miscellaneous new diseases which only in recent years have been examined, and others which require more than usual time and painstaking skill for their diagnosis. The practical value of this work to physicians and the great need of it throughout the State is well shown by the fact that in the ten years during which this work has been done by the State Laboratory, the examinations in diphtheria have increased approximately 2300 per cent, tuberculosis nearly 800 per cent, typhoid fever approximately 1000 per cent. During the year 1908 the bacterial diagnosis was limited to diphtheria, tuberculosis, and typhoid fever by the Widal test.

Serum diagnosis. Serum diagnosis of syphilis has been established three years. The number of specimens has increased about 75 per cent each year, as shown in the tables on page 272 — a most striking indication of the great and increasing demand for this laboratory diagnosis. The first year, over 12,000 examinations were made, the next year more than 22,000, and this last year 37,222. For a little more than two years a test has also been made, when requested, for the diagnosis of gonorrhea, but the significance and practical value of the results of the examination in the diagnosis of this disease is not so clearly established or so sharply defined as it is in the diagnosis of syphilis. The great practical value of the laboratory diagnosis of the venereal diseases will become increasingly apparent each year, especially in view of the extensive educational propaganda which has spread throughout the country, taking its origin in the efforts to protect the Army and the civil population from the disastrous effects of the spread of these diseases among the troops, and throughout the civil population wherever the troops are quartered.

The serum diagnosis of tuberculosis having reached a stage of experimental development which the laboratory could not entirely ignore, a special investigation of this method of diagnosis in tuberculosis was taken up early in the year 1917, but owing to the withdrawal of Mr. Maltener from the staff for war service, it is doubtful if this work can be brought to any satisfactory conclusion at the present time.

Examinations of water, sewage, ice, and milk

The laboratory has cooperated, as heretofore, with the Division of Engineering in the examination of samples of water which have been sent in by the sanitary engineers on tours of inspection of the municipal water supplies of the State. The significance of the results of these examinations has been greatly enhanced by a more complete knowledge of the conditions at the sources of the waters, which the engineers have made possible by more extensive and more numerous inspections. The chief interest in the work of 1917 lies not in the number of examinations, but in the character and significance of the examinations due to the careful field inspections.

Preparation of antitoxins, serums, and vaccines, and other products for prophylactic and therapeutic use in the prevention and cure of disease and in the control of epidemics

Diptheria and tetanus antitoxin. The number of packages which have been prepared and distributed by the laboratory during 1917 has steadily increased as compared with the previous years, and approximates the uniform rate. Owing to the war and the difficulty of obtaining supplies, the distribution of antitoxins in syringes was at first curtailed and then stopped. It will be resumed only to a small extent to meet very urgent demands of the health officers.

Antipneumoccus, antimeningococcus and antidysentery serums. The preparation and distribution of these serums has increased enormously during the year 1917. The preparation was begun and carried through in a limited way in the year 1916, but the demands of the Army were so great that the supply in this country was completely exhausted, and this laboratory was called upon to furnish its entire surplus which could be spared from the State service. The laboratory was further urged to produce as large a quantity of these serums as possible for future use.

Receiving unsatisfactory reports from the use of some of the commercial antipneumococcus and antimeningococcus serums offered for sale in the State, a careful examination of all of these serums was made by Miss Kirkbride and Miss Gilbert, and as a result of this investigation it was found necessary to call the

attention of the Public Health Council to the fact that these serums lacked potency and that no standards of potency were required of such serums which are offered for sale. The Hygienic Laboratory in Washington inspected and tested the purity of all biological products and licensed their sale, but no attempt was made to control their potency. Accordingly Regulation 1, Chapter IX, of the Sanitary Code, "Sale of Antipneumococcus and Antimeningococcus Serum Regulated", was added to the Sanitary Code of the State, and the rules and regulations providing standards of potency and methods of testing were submitted for the approval of the Commissioner.

Similarly it was found necessary to test the purity of commercial smallpox vaccines, which are offered for sale in the State of New York. This need was occasioned by the report of an outbreak of tetanus following the use of a commercial smallpox vaccine, although no reliable evidence that the smallpox vaccine was contaminated could be obtained even after prolonged investigation. In order to confirm the tests of other laboratories, and in order to be in a position to insure the purity of the vaccine which was distributed in the State, these tests were made and continued for some months without obtaining any evidence that the smallpox vaccine in question had ever been contaminated with tetanus.

In ordinary times any hygienic laboratory would be supposed to lead public opinion and to create the demand which it is able to supply; but since the beginning of the war the Division of Laboratories and Research has been compelled to shape its policy to meet one emergency after another.

Owing to the scarcity of salvarsan and the impossibility of securing any further supplies of the German product after the declaration of war, the practicability of its manufacture in the laboratory was carefully considered as a special investigation or research problem. Patent literature was consulted and many helpful suggestions were obtained from Dr. Lithgow of the Massachusetts State Department of Health where this work was under way. The progress of the work has been slow owing to the exigencies under which the work has been done,— space and equipment making it necessary that the work be done one step

at a time. Considering the fact that there are seven distinct chemical substances to be synthetized, the progress naturally has been slow and tedious. But considering the disadvantages under which Mr. Kober has labored, the outcome is very encouraging. It is too soon to make definite statements in regard to the finished product: some salvarsan has already been obtained.

Research and special investigations have been introduced into all laboratory work in conjunction with the routine procedures in order to stimulate the interest of the staff in attaining and then maintaining the highest standards in their technical procedures, but many of the special investigations have been interrupted on account of the war, and what has been accomplished along these lines has been done in spite of difficulties. Hardly any original work done during 1917 is worth commenting upon except that in connection with the production of salvarsan. For purposes of record it has been found necessary to coordinate all phases of research work and centralize it in the library.

The library and research

No one thing has contributed more to protect the laboratory against the threatened disorganziation occasioned by the war situation and to maintain and even develop its standards of efficiency in the work than the close connection which is being organized between the library and the laboratory as a whole. Time and thought have been spent during 1917 in formulating and bringing together the standard methods used in the routine work of the laboratory, and in having this technical procedure arranged so that changes and improvements made in it from time to time may be recorded and kept for reference in the library.

Also the coordination of all research work and special investigation is being centralized in the library, thus bringing all results under the critical review of the director. It is intended to have outlines and reports of problems to be undertaken or which have been concluded, together with scientific papers of every sort written by members of the staff filed in the library. This matter of having the library care for the scientific literature relating to the laboratory activities has been shown to be necessary. The laboratory has grown with such rapidity, and the demands for

further expansion have been so insistent, that the former system of filing has become entirely inadequate for the needs of rapid reference. Accordingly a special file with an accompanying index has been started.

During 1917 members of the staff presented papers and attended the following meetings of scientific societies:

Amsterdam Medical Association	Amsterdam, N. Y.
Buffalo Academy of Medicine	Buffalo, N. Y.
American Association of Pathologists and Bacteriologists	New York City.
Medical Society of the State of New York	Utica, N. Y.
American Society for Clinical Investigation	Atlantic City, N. J.
Association of American Physicians	Atlantic City, N. J.
American Public Health Association	Washington, D. C.
Philadelphia County Medical Society	Philadelphia, Pa.
Annual Conference of Biological Chemists	New York City.
American Chemical Society	Boston, Mass.
Society of Experimental Medicine and Biology	New York City.

Office

Efforts have been made to improve the work of the office. Heretofore the office assistants who have been detailed to service in the Division of Laboratories and Research have not, as a rule, had any knowledge of the biological sciences. At first, being unfamiliar with all the scientific and technical terms used and the general routine of the place they naturally can not be very useful, and later even after a considerable period spent in the work they usually have but a superficial familiarity with the scientific subjects connected with the laboratory, and are unable from lack of sufficient preliminary education to grasp the principles underlying their work and to appreciate its significance in relation to the laboratory as a whole.

The Civil Service Commission has agreed to hold a special examination which will be prepared with a view to testing the

general education and intelligence of an applicant, as well as her clerical ability. Some knowledge and experience in business methods and procedure, in bookkeeping, stenography, etc., is required, but efficient work can not be expected from a person whose intellect has not been adequately trained, nor can defects of character due to lack of early discipline be remedied. We must have adequate material to begin with, or our training represents just as much lost time as far as obtaining any commensurate return in value to the laboratory is concerned.

The noteworthy increase in the personnel of the office staff, and their interest in the work, is nevertheless apparent, and is well shown by the increasing efficiency in checking against clerical errors and the facility in conducting the routine work. The cooperation of health officers and physicians by calling attention to errors of omission and commission is always invited in order to attain the highest standards of service.

Courses of instruction

Courses of instruction in public health work have been offered to health officers and physicians of the State under the auspices of the Albany Medical College in order to enable them to meet the requirements of the Public Health Council. In these courses of instruction the laboratory has cooperated fully, giving demonstrations of all phases of its work and activities. A practical laboratory course was given under the auspices of the Albany Medical School for the New York University and Bellevue Medical School in order to enable health officers who had registered and taken the correspondence course, but who were unable to go to New York city to have the practical demonstration. A total of 114 health officers attended this course.

Branch, county, and municipal laboratories

During the year 1917 an especially noteworthy increase in the extent and importance of the work is to be noted in the records of the branch laboratory situated in New York city. These records will be found tabulated in the appendix. Long Island, and the greater part of the districts of Westchester and Rockland counties are served by this laboratory, as the health officers and physicians of these districts cannot obtain satisfactory service from Albany.

The central laboratory in Albany has been brought during the year 1917 into much closer touch with the ten county and twenty-two municipal laboratories of the State owing to increasing cooperation and supervision. The registration of all laboratories within the State, has also served to bring the laboratories into closer relation.

But more important than all these agencies is the organization of a New York State Association of Public Health Laboratories. During the year 1917 a course of instruction in the type diagnosis of pneumonia was given to the directors of several laboratories. At this time plans for a State association were formulated, and the organization will undoubtedly prove of great mutual benefit.

War work

With the declaration of war enormous demands were made upon the laboratory, and owing to the limited facilities and the fact that all the resources of the laboratory were greatly overtaxed, it was necessary to formulate new plans for the extension of the work to meet emergencies. Many of these plans, including the equipment of an additional building for laboratory purposes, failed, but with the support of funds allowed by the Adjutant General of the State and by the State Defence Council it was possible to meet some of these emergencies, though only to a limited extent. The trustees and the director of the Bender Laboratory offered half of their well equipped building for three months without compensation, and the rental of these quarters has enabled the laboratory to carry on work which otherwise it would have been impossible to do.

Despite the increased appropriations which the legislature provided for the work of 1917, many of these appropriations were exhausted within four months of the time they became available on account of the greatly increased cost of supplies and equipment, and on account of the extraordinary demands upon the laboratory. This situation was met by the support of funds provided by the Adjutant General on account of the service which the laboratory rendered the National Guard and Naval Militia. Of these appropriations amounting to $25,000, more than $20,000 were used during 1917.

The laboratory has been called upon to serve several of the United States Army camps and posts in the State or on its borders. Outfits for specimens were distributed, and specimens were received for the diagnosis of communicable diseases from Camp Mills, Camp Upton, Garden City Aviation Camp, U. S. Naval Aviation Station at Bayshore, Camp Merritt, Mobilization Camp at Syracuse, Training Camp at Madison Barracks, Training Camp at Plattsburg, and Aviation Station No. 1 at Hempstead.

The United States Army and Expeditionary Forces have taken all the surplus antipneumococcus, antimeningococcus, and antidysentery serums which the laboratory with its present facilities could prepare. These serums were distributed at first to Red Cross hospitals in France, and the Base hospitals leaving this country, but at the request of the Army Medical school all these supplies were sent to Washington to be distributed from the Army Medical school.

New troops of the State Guard, and many other organizations of the State have drawn upon the laboratory for supplies, and the laboratory has also been called upon to examine many articles suspected of being maliciously contaminated.

In order to prepare for emergencies and the field work that might be necessary in the control of epidemics, a mobile laboratory unit was assembled and prepared for immediate service. The plan of the organization of this mobile unit was reported before the laboratory section of the October meeting of the American Public Health Association in Washington.

During 1917 twelve members of the laboratory staff have been drafted, or have resigned to enter the service of the United States army in one capacity or another. Bacteriologists and technicians have been greatly needed by the army, and as many as could be spared from the work here have received the privilege of leave for service,— a privilege which is provided by a recent State law.

The salaries of the staff allowed in the appropriation bill also proved inadequate to hold trained workers in the State service. Twenty-one members of the staff resigned during 1917 to accept positions paying higher salaries varying from 15 per cent or 20 per cent up to 300 per cent increase, and averaging between 60 per cent and 70 per cent increase.

Responding to a real need the Laboratory during 1917 has been preparing laboratory workers to fill new positions or to take the places of those called away. The Laboratory cannot evade this obligation for the need has never been greater than it is at the present time for trained workers in bacteriology, and with the exception of the New York City laboratories there is probably no other place in the country where so many really capable assistants can be trained in so short a time. The Laboratory will probably be called upon still further to provide instruction and practice for persons who are anxious to fit themselves for laboratory work.

The demands upon the Laboratory continue to increase. The pressure of the work is well shown by the overtime of the staff which when figured in the time of one person per month, averages over forty weeks' work for each month, and this amounting in a year to approximately 500 weeks' work for one person. Our problem is to meet the needs of health officers and physicians as fully as we can, in spite of the depletion of our scientific staff and the inconvenient conditions under which our work must be done until the new laboratory building is finished; and to be ready at all times to meet emergencies which may arise in connection with the war.

No one thing has contributed more to the successful conduct of the work or aided in fostering a spirit of national, as well as State service, than the interest, appreciation, and support of Governor Whitman and the Legislature.

Respectfully submitted,

A. B. WADSWORTH,
Director

DIAGNOSTIC EXAMINATIONS

Central Laboratory, Albany, N. Y.

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917
Diphtheria										
Culture examinations										
Positive	741	755	1,822	1,761	1,322	2,909	4,242	7,135	7,082	7,625
Negative	735	1,014	4,580	5,573	4,298	6,127	8,704	11,330	11,795	17,613
Unsatisfactory	121	201	.....	.....	.....	.....	917	804	1,577	1,569
Re-examinations	.....	.....	.....	.....	.....	.....	.....	4,824	4,813	4,892
Virulence tests	.....	.....	.....	.....	.....	.....	.....	37	221	69
Special epidemics — total (Poughkeepsie)	.....	.....	.....	.....	.....	.....	.....	.....	107	.....
Total	**1,597**	**1,970**	**6,402**	**7,334**	**5,620**	**9,036**	**13,863**	**24,130**	**25,595**	**31,768**
Tuberculosis										
Sputum examinations										
Positive	329	526	584	658	793	691	875	1,117	1,370	1,423
Negative	498	1,245	1,277	1,755	1,966	2,192	2,318	2,198	3,919	4,464
Unsatisfactory	15	5	.....	.....	.....	.....	.....	62	36	28
Total	**842**	**1,776**	**1,861**	**2,413**	**2,759**	**2,883**	**3,193**	**3,377**	**5,325**	**5,915**
Enteric diseases										
Blood agglutination tests										
Typhoid fever										
Positive	147	92	254	288	297	350	435	610	965	937
Negative	282	179	378	441	552	665	896	970	1,966	1,863
Unsatisfactory	70	87	.....	.....	.....	.....	.....	208	106	233
Total	499	358	632	729	849	1,015	1,331	1,788	3,037	3,033
Paratyphoid fever										
Positive	.....	.....	.....	.....	.....	.....	.....	.....	.....	1–A*
	.....	.....	.....	.....	.....	.....	.....	.....	.....	2–B*
	.....	.....	.....	.....	.....	.....	.....	.....	.....	43–A&B*
Negative	.....	.....	.....	.....	.....	.....	.....	.....	.....	7–A*
	.....	.....	.....	.....	.....	.....	.....	.....	.....	4–B*
Unsatisfactory	.....	.....	.....	.....	.....	.....	.....	.....	.....	4*
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	61*
Dysentery										
Positive	.....	.....	.....	.....	.....	.....	.....	.....	.....	1*
Negative	.....	.....	.....	.....	.....	.....	.....	.....	.....	1*
Unsatisfactory	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	2*
Special epidemics —total — (Poughkeepsie and 2d Regt.)	.....	.....	.....	.....	.....	.....	.....	.....	3,174	.....
Total	**499**	**358**	**632**	**729**	**849**	**1,015**	**1,331**	**1,788**	**6,211**	**3,097**
Blood cultures										
Special epidemics — total —(Poughkeepsie and 2d Regt.)	.....	.....	.....	.....	.....	.....	.....	.....	60	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	60	.....
Examination, intestinal discharges										
Typhoid fever										
Positive	.....	.....	.....	.....	.....	.....	.....	15	81	124
Negative	.....	.....	.....	.....	.....	.....	.....	149	687	606
Unsatisfactory	.....	.....	.....	.....	.....	.....	.....	20	4	2
Total	.....	.....	.....	.....	.....	.....	.....	184	772	732
Paratyphoid fever										
Positive	.....	.....	.....	.....	.....	.....	.....	.....	.....	*6–B
Negative	.....	.....	.....	.....	.....	.....	.....	.....	.....	*90
Unsatisfactory	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	*96
Dysentery										
Positive	.....	.....	.....	.....	.....	.....	.....	.....	.....	*6
Negative	.....	.....	.....	.....	.....	.....	.....	.....	.....	*93
Unsatisfactory	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	*99
Special epidemics — total — Poughkeepsie and 2d Regt.)	.....	.....	.....	.....	.....	.....	.....	.....	1,567	.....
Total	.....	.....	.....	.....	.....	.....	.....	184	**2,339**	**927**

* Separate records were kept of the examinations of paratyphoid fever and dysentery after July, so that this tabulation represents only six months

DIAGNOSTIC EXAMINATIONS — (Continued)
Central Laboratory, Albany, N. Y. — (Continued)

	1906	1909	1910	1911	1912	1913	1914	1915	1916	1917
Syphilis										
Wassermann tests										
Positive								1,212	2,474	3,378
Negative								3,378	5,854	9,002
Unsatisfactory								219	454	706
Doubtful								847	1,249	1,821
Re-examinations								6,524	11,304	17,292
Total								**12,180**	**21,335**	**32,199**
Gonorrhea										
Complement fixation										
Positive								1	55	150
Negative								22	836	1,909
Unsatisfactory								24	64	244
Doubtful								7	293	626
Re-examinations								5	2,056	2,414
Total								59	3,304	5,343
Microscopical examinations										
Positive								17	128	100
Negative								76	868	241
Unsatisfactory								5	148	53
Total								98	1,144	394
Total								**157**	**4,448**	**5,737**
Pneumonia										
Pneumococcus type differentiation, sputum										
Positive, Type I										127
type II										38
type II, atyp										26
type III										70
type IV										146
Negative										137
Unsatisfactory										27
Supplemental reports										
Positive, type IV										6
Total								17	174	577
Urine										
Negative										4
Spinal fluid										
Positive, type IV										1
Negative										1
Total										2
Total								17	174	**583**
Other diseases							91	151	541	740
Special epidemics (Poughkeepsie)									87	
Total							91	151	628	
Total	2,938	4,104	8,895	10,476	9,228	12,934	18,478	41,984	66,115	80,966

DIAGNOSTIC EXAMINATIONS — (Continued)
Branch Laboratory, New York City

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917
Diphtheria										
Culture examinations										
Positive								1,387	902	824
Negative								1,780	1,898	2,780
Unsatisfactory								458	325	241
Re-examinations								100	564	1,047
Virulence tests									48	77
Total								**3,725**	**3,737**	**4,969**
Tuberculosis										
Sputum examinations										
Positive								52	46	125
Negative								113	130	311
Unsatisfactory									5	6
Total								**165**	**181**	**442**
Typhoid fever										
Blood agglutination tests										
Positive								18	48	70
Negative								53	387	148
Unsatisfactory								13	8	30
Total								84	443	248
Examination intestinal discharges										
Positive								1	11	10
Negative								2	532	1,689
Unsatisfactory									1	64
Total								3	544	1,763
Total								**87**	**987**	**2,011**
Syphilis										
Wassermann tests										
Positive								62	224	1,320
Negative								201	935	2,960
Unsatisfactory								44	137	437
Doubtful										
Re-examinations									57	356
Total								**307**	**1,353**	**5,073**
Gonorrhea										
Complement fixation										
Positive								19	7	23
Negative								13	96	567
Unsatisfactory								23	35	61
Doubtful										
Re-examinations								52	20	47
Total								107	158	698
Microscopical examinations										
Positive								3	5	13
Negative								2	6	24
Unsatisfactory								1	3	5
Total								6	14	42
Total								**113**	**172**	**740**
Pneumonia										
Pneumococcus differentiation									33	123
Other diseases								60	61	77
Total								4,457	**6,524**	**13,435**

REPORT OF LABORATO

LABORATORY	DIAGNOSTIC EXAMINATIONS										
			TYPHOID FEVER				GONORRHEA		MISCELLANEOUS		
	Diphtheria	Tuberculosis	Blood	Feces	Malaria	Syphilis	Serum	Smear	Paratyphoid	Pneumonia	
New York State Department of Health Laboratory											
Albany	31,768	5,915	3,033	732	104	32,199	5,343	394	158	583	580
Branch Laboratory New York City	4,969	442	248	1,763	32	5,073	698	42	.....	123	45
State Institute for study of malignant diseases	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
COUNTY											
Batavia, Genesee Co	603	245	46	3	.....	1	.....	123	.....	.....	.....
Belmont, Allegany Co.(closed from Aug. 20 to Nov. 1)	118	95	57	.....	.....	.....	.....	5	.....	.....	.....
Canandaigua, Ontario Co	255	167	56	.....	4	19	1	44	.....	.....	.....
Corning, Steuben Co	3,040	295	198	.....	.....	.....	23	121	.....	.....	.....
Geneseo, Livingston Co	29	77	11	.....	.....	.....	.....	8	.....	.....	.....
Glens Falls, Warren Co	895	227	48	.....	.....	12	5	45	.....	.....	.....
Oneida, Madison Co	109	86	26	.....	.....	.....	.....	5	.....	.....	1
Rochester, Monroe Co	826	69	35	.....	.....	.....	.....	4	.....	.....	.....
Schenectady, Schenectady Co.	737	415	151	.....	35	959	.....	109	32	5	11
Syracuse, Onondaga Co	964	277	97	.....	.....	.....	.....	7	.....	.....	.....
CITY											
Albany, Bender	3,647	1,426	558	29	5	2,234	.....	33	28	.....	.....
Amsterdam	309	195	35	.....	5	.....	.....	40	.....	.....	1
Auburn	300	130	30	.....	.....	.....	.....	74	.....	.....	2
Binghamton	3,795	121	32	.....	.....	.....	.....	18	16	.....	5
Buffalo	19,604	2,651	939	.....	5	6,728	32	1,115	36	54	70
Dunkirk	140	48	21	.....	2	.....	.....	27	.....	.....	.....
Elmira	951	83	109	17	2	.....	.....	22	.....	.....	.....
Gloversville	731	101	.....	.....	1	.....	.....	25	.....	.....	.....
Jamestown	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mt. Vernon	531	62	21	.....	.....	.....	.....	.....	.....	.....	.....
Newburgh	154	54	2	.....	8	.....	7	79	.....	.....	1
Niagara Falls	2,297	340	20	.....	.....	.....	.....	26	.....	.....	3
Olean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Otisville	402	.....	1	.....	.....	.....	.....	.....	.....	3	.....
Poughkeepsie	752	81	78	936	3	.....	13	37	.....	.....	4
Rochester	2,156	916	358	.....	.....	22	.....	.....	.....	172	.....
Rome	84	.....	13	.....	.....	.....	.....	.....	.....	.....	2
Syracuse	9,971	1,293	398	40	.....	85	42	239	.....	133	23
Troy	682	239	218	.....	.....	39	.....	5	.....	.....	5
Tuxedo Park	51	24	34	41	6	.....	1	19	.....	3	.....
Utica (records incomplete)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yonkers	1,231	845	99	8	31	.....	.....	218	.....	.....	.....
INSTITUTIONAL AND PRIVATE											
White Plains, New Rochelle, Dobbs Ferry (von Wedel Laboratories)	509	157	120	5	456	349	.....	.....	1	4	82
Ogdensburg	11	178	69	11	.....	635	.....	49	.....	2	.....
Utica (Dr. Wilson)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Totals	92,626	17,254	7,161	3,585	699	48,355	6,165	2,931	271	1,12	839

* Data given in separate tabulation.

RIES FOR YEAR 1917

MISCELLANEOUS EXAMINATIONS												PREP. OF VACCINES			LABORATORY
Smears	Blood	Urine analysis	Stomach contents	Body fluids	Feces	Pathological specimens	Postmortem examinations	Milk analysis	Cream analysis	Water analysis	Miscellaneous	Stock	Autogenous	Totals	
.....	.....	.....	.....	.....	.....	157	....	.....	.....	1,721	.....	..	6	82,693	New York State Dept. of Health Laboratory, Albany
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..	....	13,435	Branch Laboratory, New York City
.....	.....	.....	.....	.....	.....	2,330	.....	.....	.....	.....	.....	*	....	2,330	State Inst'ute for study of malignant dis'ses.
															COUNTY
16	93	1,407	4	....	2	.....	....	35	9	8	48	..	....	2,648	Batavia, Genesee Co.
5	75	110	....	....	15	.....	....	5	2	90	5	..	1	583	Belmont, Allegany Co. (Closed from Aug. 20 to Nov. 1)
5	199	202	10	3	3	34	5	256	....	23	117	..	5	1,408	Canandaigua Ont. Co.
376	671	1,409	46	9	17	96	2	513	1	516	170	..	33	7,536	Corning, Steuben Co.
.....	4	257	....	....	1	.....	....	14	....	30	10	..	....	441	Geneseo, Liv'ston Co.
37	507	2,880	7	....	78	253	9	59	3	11	129	..	....	5,205	Glens Falls, Warren Co.
16	6	17	1	....	1	.....	1	14	....	36	.....	..	12	331	Oneida, Madison Co.
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	..	....	936	Rochester, Oneida Co.
516	231	2,865	7	47	12	567	10	130	23	14	248	..	....	7,124	Schenectady, Sch'y Co.
3	4	68	....	....	1	.....	....	10	2	57	.....	..	1	1,491	Syra'se, Onondaga Co.
															CITY
1,103	92	109	6	346	33	2,846	65	1,646	....	32	278	..	67	14,583	.....Albany, Bender
15	84	.....	1	1	9	.....	....	779	4	.....	.....	..	4	1,482	.....Amsterdam
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..	.....	536	.....Auburn
4	2	.....	2	.....	.....	4	....	859	3	669	88	..	2	5,620	.....Binghamton
21	1	113	....	193	1	1	....	12,624	1	757	2,974	..	3	47,923	.....Buffalo
.....	22	56	.....	.....	2	1	....	134	10	.....	4	.....	.....	467	.....Dunkirk
147	133	2,195	12	....	27	41	1	854	....	65	12	..	12	4,683	.....Elmira
42	18	.....	2	2	3	.....	.....	26	....	1	.....	..	17	967	.....Gloversville
.....	.....	.....	.....	.....	.....	.....	.....	3,010	194	.....	.....	.....	.....	3,204	.....Jamestown
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	614	.....Mt. Vernon
56	.....	.....	.....	.....	.....	.....	18	130	39	.....	.....	.....	.....	548	.....Newburgh
6	1	69	4	7	.....	.....	.....	4,548	18	28	.....	.....	.....	7,367	.....Niagara Falls
.....	.....	.....	.....	.....	.....	.....	.....	1,080	....	.....	.....	.....	.....	1,030	.....Olean
.....	.....	2	....	1	.....	.....	.....	.....	.....	.....	1	.....	2	412	.....Otisville
2	3	16	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,925	.....Poughkeepsie
.....	.....	.....	.....	.....	.....	.....	.....	2,844	.....	48	96	.....	.....	7,053	.....Rochester
2	.....	.....	.....	.....	.....	.....	.....	373	14	32	2	.....	.....	522	.....Rome
4	13	56	.....	.....	13	.....	.....	3,033	215	630	677	.....	.....	16,918	.....Syracuse
.....	.....	68	.....	.....	.....	.....	.....	498	.....	12	.....	.....	.....	1,766	.....Troy
79	320	543	18	....	62	1	....	129	77	109	14	..	12	1,535	.....Tuxedo Park
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....Utica
6	.....	1,037	....	4	2	.....	....	1,010	54	11	16	..	.....	4,572	.....Yonkers
109	819	1,161	29	55	54	130	....	1,089	70	182	356	..	86	6,766	.....Dobbs Ferry
8	121	1,593	9	115	7	1,005	122	.....	.....	.....	7	..	8	3,950	.....Ogdensburg
.....	.....	.....	.....	.....	.....	.....	.....	52	1	.....	.....	.....	.....	54	...Utica (Dr. Wilson)
2,579	3,419	16,233	158	783	343	7,466	233	36,704	740	5,514	5,253	..	272	260,708	.....Totals

DISTRIBUTION OF DIAGNOSTIC OUTFITS

	Diphtheria culture outfits and tubes	Tuberculosis sputum outfits	Typhoid fever-Widal outfits	Typhoid fever-feces outfits	Syphilis-Wassermann outfits	Gonorrhea smear outfits	Malaria outfits	Miscellaneous outfits	Total
1913				No records					15,984
1914				No records					39,396
1915	41,419	8,391	6,666	3,181	9,103	1,138	356	2,108	72,362
1916	49,331	9,096	8,184*	4,819*	15,039	2,884	1,267	3,555	94,175
1917	59,204	9,866	6,269	3,448	20,566	2,095	971	4,217	106,636

* This exceptional increase is due to the paratyphoid epidemic among the troops returning to the State from the Mexican border.

DISTRIBUTION OF DIPHTHERIA AND TETANUS ANTITOXINS AND RECORD OF ADMINISTRATION

YEAR	Total number of packages	[Total] number of packages computed to 1,500 units each for purposes of comparison year by year	Number of syringes	Average number of units per c. c.	Total number of units distributed	Total reports of cases treated	Total reports of recoveries	Number of units used	Total deaths	Total number of units used	Other diseases treated	Number of units used	Number of persons immunized	Number of units used
Antitoxin														
Diphtheria														
1902		6,552		300										
1903		14,121		325										
1904		16,374		375										
1905		16,303	No. syringes distributed	350					No records					
1906		17,794		350										
1907		23,629		450										
1908		25,469		350										
1909		24,429	*	370	36,643,500	1,823	1,235	10,000,000	134	1,250,000	42	613,750	432	2,000,000
1910		36,916		530	55,374,000	1,863	1,700	11,700,000	163	1,800,000	35	700,000	3,920	5,000,000
1911		43,703	No record	550	65,563,500	2,566	2,354	15,813,650	212	2,504,000	52	174,500	3,921	9,530,350
1912		40,745		550	61,117,500	2,535	2,345	18,779,700	190	2,216,500	150	450,000	5,024	7,574,095
1913		44,426		600	66,639,000	1,943	1,769	11,892,600	177	1,719,400	.....	474,000	3,055	6,134,400
1914	26,461	52,644	17,154	†552	78,966,000	2,149	1,982	12,693,950	167	2,012,100	285	1,473,500	1,994	3,721,950
1915	29,470	55,649	15,140	†791	83,473,500	2,687	2,370	12,201,750	317	3,023,500	74	251,400	1,966	4,253,350
1916	21,171	59,803	8,852	†1,040	89,704,500	2,129	1,964	15,095,800	165	2,054,400	25	87,500	1,920	4,555,500
1917	28,587	67,690	3,503	896	101,535,000	1,483	1,372	10,809,100	111	1,287,100	24	82,500	1,393	1,650,700
Tetanus														819,950
1909		4,246			6,369,500	21	5		10	687,000				326,400
1910		9,655			14,482,500	14	5		9	1,950,500				587,400
1911		8,095			12,142,500	23	7		16	1,474,000				791,450
1912		8,508			12,762,000	31	9		22	1,413,000				740,400
1913		7,813			11,719,500	25	8		17	1,328,000				1,762,200
1914	7,005	16,050			24,075,000	15	2		13	153,500			699	823,800
1915	8,664	28,095		No record	42,142,500	16	2	16,000	14	374,000			410	1,275,450
1916	8,842	23,306		1,024	34,959,000	66	33	727,100	33	929,000	10	13,000	778	1,202,250
1917	8,616	26,294		971	39,441,000	28	24	293,500	4	146,300			558	
				1,056.9										

* Syringes used from this date.
† All antitoxin accurately standardized.

DISTRIBUTION OF SERUMS, VACCINES AND OTHER CURATIVE AND PREVENTIVE PREPARATIONS, AND MISCELLANEOUS SUPPLIES

	SERUM				VACCINES																
	Antipneumococcus	Antimeningococcus	Antidysentery	Poliomyelitis*	Typhoid	Paratyphoid	Typhoid-paratyphoid	Dysentery	Pertussis	Smallpox* (10 doses per bottle)	Rabies	Autogenous	Tuberculin	Opthalmia neonatorum outfits	Schick outfits	Diphtheria toxin-antitoxin mixture	Dysentery toxin-antitoxin mixture	Standard sera, toxin, etc.	Media, bottles	Media, tubes	Cultures
1914, Number of packages	.....	.....	.....	.....	1,457	.....	.....	.....	.....	.....	.....	.....	.....	24,650	.....	.....	.....	.....	.....	.....	.....
1915, Number of packages	16	30	.....	.....	5,656	.....	.....	.....	211	.....	.....	1	.....	43,307	.....	.....	.....	.....	.....	.....	.....
1916, Number of packages	433	426	22	65	6,058	106	.....	23	4,127	515	10	4	6	30,798	4	.....	.....	.....	.....	.....	.....
1917, Number of packages	2,253	1,963	614	....	7,690	739	920	64	4,521	3,951	215	6	36	27,077	138	188	188 (455 c.c.)	774 (19,736 c.c.)	438 (110,667 c.c.)	1,016	350

* Poliomyelitis serum used in the treatment of policmyelitis and the vaccine used against smallpox have been distributed only to meet special emergencies. Smallpox vaccine is not yet ready for general distribution. Supplies of the pure vaccine are sent to institutions or schools where it will be used immediately in order to secure practical tests of the variations in its potency, which cannot as yet apparently be controlled in the manufacture on a large scale. This vaccine is the pure vaccine prepared by the methods of Dr. Noguchi of the Rockefeller Institute.

WATER ANALYSES

	1908	1909	1910	1911	1912	1913	1914*	1915*	1916*	1917*
Bacterial	1,175	1,056	1,564	2,131	2,800	2,017	1,091	1,447	1,352	1,189
Chemical	626	646	1,097	1,850	2,400	2,507	703	661	526	532

* The decrease in the number of water analyses is due to the fact that careful field inspections on all samples of water sent to the laboratory for examination were required for the first time in 1914.

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as— Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present) (− = Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Addison	Well, 4th strata, 43 ft. deep, public supply	12/ 6/17									17.00				20	−	−	−	..
Addison	Well, 3rd strata, 37 ft. deep, public supply	12/ 6/17									18.00				25	−	−	−	..
Addison	Well, 2d strata, 30 ft. deep, public supply	12/ 6/17									15.00				20	−	−	−	..
Afton	Infiltration gallery, public supply	8/28/17													400	+	+	+	..
Afton	Tap in depot, public supply	8/28/17					.002	.026		.06	.75	20.8	17.00	.90					
Albion	Tap, well supply, power house, public supply	2/17/17													140	+	+	−	..
Albion	Tap, public supply	2/17/17	22	Clear			0.14	0.18	.007	1.60	15.00	200.00	168.00	4.30	120	+	−	−	..
Altamont	Tap, public supply	11/23/16	35	30			.028	.202	.003	0.60	2.60	103.60	90.00	6.20	350	+	−	−	..
Angelica	Tap, public supply	4/ 5/17	Clear	Trace			.003	.002	Trace	Trace	1.75	61.40	54.00	0.40	35	−	−	−	..
Arcade	Spring No. 1, public supply	9/10/17					.010	.008		1.0	2.00	111.40		.70	3,800	−	−	−	..
Arcade	Spring No. 2, public supply	9/10/17	5				.026	.030		0.3	1.25	97.20	95.00	1.20	650	−	−	−	..
Arkport	Tap, public supply	3/12/17	2	Clear	140	28	.020	.028	Trace	0.50	2.25	158.60	115.00	.50	240	+	−	−	..
Arkport	Tap, No. 1 public supply	9/24/17														+	−	−	..
Arkport	Tap, No. 2 public supply	9/24/17					.004	.140		0.2	1.75	128.60	126.00	1.30		+	−	−	..
Arkville	Tap, public supply	8/ 6/17					.004	.018		0.24	1.00	19.50	16.50	.30	750	+	−	−	..
Attica	Reservoir, untreated water, public supply	10/10/17	15	5			.010	.034	.004	0.16	3.50	111.40	94.00	3.60	220	+	+	−	..
Attica	Tap, public supply	10/10/17	15	Trace			.014	.050		0.20	3.50	103.60	95.00	3.20	50	+	+	−	..
Auburn	Tap in physicians residence, Auburn prison	1/23/17	Trace	Trace	152	130	.012	.078	.003	0.36	2.25	103.60	103.00	2.00	30	+	−	−	..
Auburn	Tap in bucket house, Auburn prison	1/23/17	5	3	174	134	.210	.210	.040	0.24	4.75	120.00	114.00	6.10	8,900	+	+	+	..
Auburn	Spring No. 1, Auburn prison	6/13/17														+	−	−	..
Auburn	Pump at house No. 2, Auburn prison	6/13/17					.002	.118		9.60	52.00	400.00	365.00	5.00	3,000	+	+	−	..
Auburn	Pump in barn from spring No. 3, Auburn prison	6/13/17	15	8			.028	.110	.015	14.40	29.00	357.00	231.00	3.90	57,500	+	+	+	..
Auburn	Pump near shack, Auburn prison	6/13/17					.028	.084		6.60	29.00	422.30	324.00	3.10	12,000	+	+	+	..
Auburn	Brook from sewage disposal plant, prison	6/13/17														+	+	+	..
Ballston	Tap, pumping station, public supply	7/16/17					.008	.076	Trace	.02	1.75	27.30	26.00	.90	90	+	−	−	..
Ballston	Parmeton spring, public supply	7/16/17													70	+	−	−	..
Ballston	Spring, Round Hollow Reservoir, public supply	7/16/17													100	+	+	−	..
Ballston	Bordett springs, public supply	7/16/17													600	+	+	−	..
Barker	Raw water, public supply	1/12/17	5	20	262	230	.040	.126	.003	0.16	10.00	128.60	103.00	1.00	6,600	+	+	+	..
Barker	Filtered water, public supply	1/12/17	5	Clear			.008	.072	Trace	0.10	10.25	137.20	114.00	2.10	450	+	−	−	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as—				Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present) (− = Absent)			
							Free ammonia	Albuminoid ammonia	Nitrites	Nitrates						10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Barker	Tap, public supply	12/27/17	10	2			.002	.044	Trace	0.14	10.00	108.60	101.00	2.60	15	+	−	−	..
Batavia	Tap, unfiltered water, new hospital, New York State School for Blind	2/16/17	12	2			.024	.046	.011	0.68	5.20	146.00	.....	0.50	150	+	+	+	..
Batavia	Tap, filtered city water, New York State School for Blind	2/16/17	3	Trace			.003	.052	.003	0.14	4.50	131.00	.....	2.60	150	+	+	+	..
Batavia	Tap, well supply, New York State School for Blind	2/16/17	Trace	Clear			.024	.052	.005	0.80	8.80	315.00	231.00	0.70	40	+	−	−	..
Batavia	Pump, cistern water, New York State School for Blind	2/16/17	Trace	Clear			0.04	.092	.002	0.80	1.80	31.00	20.00	1.20	70	+	−	−	..
Batavia	Tap, in physician's office, main building, New York State School for Blind	11/13/17	.....	.....	.....	.....	.004	.024	.....	0.60	6.80	300.00	272.00	0.80	15,000	−	−	−	..
Batavia	Tap in kitchen, main building, New York State School for Blind	11/13/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,100	+	+	−	..
Batavia	Tap, in officers' and teachers' dining-room, New York State School for Blind	11/13/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,400	+	−	−	..
Bath	Well, Soldiers and Sailors' Home	9/ 6/17	.....	.....	.....	.....	.028	.010	.....	.02	5.00	157.20	154.00	.50	180	+	−	−	..
Bath	Reservoir, Soldiers and Sailors' Home	9/ 6/17	.....	Trace	.....	.....	.016	.024	.....	2.0	4.00	165.80	163.00	.40	400	+	−	−	..
Bath	Tap, hospital, Soldiers and Sailors' Home	9/ 6/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	850	+	−	−	..
Bath	Spring, Soldiers and Sailors' Home	9/ 6/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,900	+	−	−	..
Bath	Tap, at pumping station, public supply	9/30/17	.....	.....	.....	.....	.002	.008	.....	1.00	6.75	201.50	194.00	.10	425	−	−	−	..
Beacon	Tap, W. Washington st., public supply	9/30/17	.....	.....	.....	.....	.002	.002	.....	1.00	6.75	201.50	194.00	.10	190	−	−	−	..
Beacon	Tap, Administration Bldg., Matteawan State Hospital	9/11/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,000	+	+	+	..
Beacon	Tap, at pumping station, Matteawan State Hospital	9/11/17	.....	Trace	.....	.....	.134	.010	.005	.70	16.00	291.60	214.00	.50	6,500	+	+	+	..
Bedford Hills	Tap, livery stable, Matteawan State Hospital	9/11/17	Trace	Trace	.....	.....	.002	.025	.....	.02	2.25	19.50	15.00	1.40	100	−	−	−	..
Bedford Hills	Overflow at reservoir, public supply	1/ 2/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	−	−	−	..
Bedford Hills	Tap near spring, public supply	1/ 2/17	Trace	Trace	150 00	125 00	.012	.038	.001	1.60	7.50	81.40	76.00	0.30	25	−	−	−	..
Bedford Hills	Well supply, public supply	1/ 2/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	−	−	−	..
Bedford Hills	Tap, Administration Bld'g, New York State Reformatory for Women	7/ 4/17	.....	.....	.....	.....	.002	.02	.....	.40	8.50	65.70	64.00	.60	11,500	+	−	−	..
Belfast	Broad Brook, auxiliary for fire, New York State Reformatory for Women	7/ 4/17	25	.....	.....	.....	.048	.110	.005	.40	8.50	62.90	61.00	3.20	25,000	+	+	+	..
	Tap, public supply	7/13/17	.....	.....	.....	.....	.004	.026	.....	.12	12.25	222.80	218.00	1.20	900	−	−	−	..

Belmont	Tap, public supply	4/ 6/17	20	8			.015	.080	.001	0.04	1.75	95.80	19.00	3.10	1.60	+					..
Berlin	Intake, small brook, public supply	4/12/17													180						..
Berlin	Intake, main brook, public supply	4/12/17													80						..
Berlin	Kendall pond, public supply	4/12/17	33	Trace			.025	.058	Trace	0.04	1.50	11.10	7.00	5.70	45	+					..
Berlin	Tap, public supply	4/12/17	4	Trace			.01	.018	.002	Trace	1.00	23.40		2.70	15						..
Bolivar	General supply, Bolivar Water Co., public supply	4/20/17	5	Trace			.015	.002	0.04	Trace	13.00	114.20		1.00	5						..
Bolivar	Wells, supply, Bolivar Water Co., public supply	4/20/17	Clear	Trace			.031		Trace	Trace	13.25	121.40		0.80	15						..
Briarcliff Manor	Well No. 1, public supply	9/26/17																			..
Briarcliff Manor	Well No. 2 public supply	9/26/17														+					..
Briarcliff Manor	Well No. 3, public supply	9/26/17													4,900	+					..
Briarcliff Manor	Well No. 4, public supply	9/26/17													10,500						..
Briarcliff Manor	Well No. 5, public supply	9/26/17													2,900						..
Briarcliff Manor	Well No. 6, public supply	9/26/17																			..
Briarcliff Manor	Well No. 7, public supply	9/26/17													750						..
Briarcliff Manor	Tap at pumping station, public supply	9/26/17					.606	.004		.50	4.75	85.70	70.00	.20	800	+					..
Brockport	Raw water, public supply	3/ 8/17	15	6			.021	.14	.012	.40	10.50	114.00	98.00	1.40	2,100	+	+				..
Brockport	Filtered water, public supply	3/ 8/17	12	3			.0174	.158	.013	.32	10.60	135.00	96.00	1.60	1,100	+	+				..
Brockport	Raw lake water, public supply	8/ 3/17		2			.056	.138	.002	.06	9.50	109.00	98.00	2.80	1,800						..
Brockport	Influent to filter, public supply	8/ 3/17													72,500						..
Brockport	Effluent from coagulating basin, public supply	8/ 3/17													48,000	+	+				..
Brockport	Tap, public supply	8/ 3/17					.012	.088	Trace	.10	9.50	114.20	99.00	1.90	3,600	++					..
Brooklyn	Tap, artesian well, Long Island State Hospital	3/12/17		Clear			.008	.004	Trace	3.50	15.25	134.20	94.00	0.20	10						..
Brooklyn	City mains, supply at Creedmore, Long Island State Hospital	3/12/17	5	2			.050	.065	.002	.58	10.90	46.40	12.00	0.20	10						..
Buffalo	Tap, city water before electrolytic treatment, State Hospital, Ward No. 13	3/ 8/17	9	5			.018	.054	.012	.12	9.00	117.20	97.00	0.30	66						..
Buffalo	Tap, city water after electrolytic treatment, State Hospital	3/ 8/17	3				.003	.028	.03	.10	8.75	114.20	94.00	0.35	7						..
Buffalo	Raw city water, taken from men's kitchen, State Hospital	3/16/17																			..
Buffalo	City water, taken from men's kitchen, after passing thru electrolytic plant, State Hospital	3/16/17													30						..
Buffalo	City water from Elmwood Bld'g, after passing through electrolytic plant, State Hospital	3/16/17													3						..
Burke	Tap, public supply	5/ 4/17	2	Trace			0.30	.011	Trace	Trace	2.50	62.90	54.00	0.90	45						..
Castleton	Reservoir, public supply	8/16/17	20	7			.030	.192	.004	.40	3.00	131.40	116.00	3.00	400	+	+				..
Castleton	Tap, public supply	8/16/17													250						..
Castleton	Reservoir, public supply	9/ 4/17	15	5			.078	.109	Trace	.20	2.50	125.80	115.00	1.80	200	+	+				..
Castleton	Tap, public supply	9/ 4/17	Trace				.016	.052	.015	.40	2.50	125.80	116.00	.90	650	+	+				..
Catskill	Raw Hudson River water, public supply	10/16/17	50	7			.046	.168	.015	.14	3.50	75.70	70.00	22.00	1,100	+	+				..
Catskill	Tap, public supply	10/16/17	50	7			.008	.148	.010	.12	4.00	75.70	69.00	20.80	250						..
Central Islip	Tap, on pump, South Colony, State Hospital	1/ 2/17	Trace	Clear	37	29	.024	.005	.001	0.04	4.00	18.20		1.50	5						..
Central Islip	Tap, center operating room, South Colony, State Hospital	1/ 2/17													5						..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	NITROGEN AS—				Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. COLI TYPE (+ = PRESENT) (− = ABSENT)			
							Free ammonia	Albuminoid ammonia	Nitrites	Nitrates						10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Central Islip	Tap on pump, North Colony, State hospital	1/ 2/17	Trace	Clear	77	68	.010	.008	.001	1.00	8.00	32.50	.....	1.20	5	−	−	−	..
Central Islip	Tap, refrigerating room, North Colony, State hospital	1/ 2/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	−	−	−	..
Cambridge	Spring, public supply	4/11/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	160	−	−	−	..
Cambridge	Overflow at reservoir, public supply	4/11/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	120	+	−	−	..
Cambridge	Tap, public supply	4/11/17	Clear	Trace	.....	.....	.007	.00.	Trace	Trace	1.50	37.70	30.00	1.25	40	+	−	−	..
Carthage	Tap, public supply	6/30/17	60	.....	.....	.....	.008	.154	.....	.03	6.00	16.90	15.00	16.00	5,500	+	+	−	..
Chaffee	Tap on pump, old well, public supply	9/24/17	.....	.....	.....	.....	.002	.002	.....	1.6	2.75	137.20	133.00	.10	.....	−	−	−	..
Chaffee	Tap, on pump, new well, public supply	9/24/17	.....	.....	.....	.....	.002	.002	.....	1.6	2.75	137.20	134.00	.10	.....	−	−	−	..
Chateaugay	Tap, public supply	5/ 3/17	.....	.....	92	.....	.006	.018	.....	.70	2.25	51.40	58.00	2.50	40	−	−	−	..
Chatham	Tap, Boston & Albany station, public supply	7/26/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45	−	−	−	..
Chatham	Tap, F. W. Fellow, public supply	7/26/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35	−	−	−	..
Chatham	Tap, village hall, public supply	7/26/17	.....	8	258	.....	.002	.012	Trace	1.20	6.00	90.00	85.00	.80	50	−	−	−	..
Cherry Valley	Tap, public supply	5/17/17	.....	.....	.....	.....	.012	.04	.....	.20	2.20	62.90	62.00	2.90	15	−	−	−	..
Chester	Walton Lake, public supply	7/13/17	.....	Trace	.....	.....	.010	.10.	.....	.02	2.75	22.10	19.00	1.80	22,000	−	−	−	..
Clayville	Clayville, public supply	7/26/17	5	.....	.....	.....	.004	.024	.005	.20	1.75	188.40	185.00	2.30	13,600	+	−	−	..
Cohocton	Composite spring, collected before emptying into reservoir, public supply	9/25/17	10	20	.....	.....	.008	.056	Trace	.70	2.00	37.70	36.00	1.40	200	+	+	+	..
Cohocton	Sample from first spring, public supply	9/25/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	55,000	+	+	+	..
Comstock	Dolph pond at overflow of dam, Great Meadow Prison	1/10/17	5	Clear	68	48	.008	.88	.001	.002	1.00	40.30	22.00	5.00	30	−	−	−	..
Comstock	Tap, from artesian well, Great Meadow Prison	1/10/17	Trace	Trace	410	347	Trace	.014	.001	0.02	2.00	343.00	330.00	1.00	15	−	−	−	..
Comstock	Tap, on Dolph pond supply, Great Meadow Prison	1/10/17	5	Trace	60	42	.020	.114	.001	0.20	1.00	36.40	22.00	5.10	10	−	−	−	..
Cuba	Tap, public supply	4/ 6/17	.....	Trace	.....	.....	.003	Trace	Trace	Trace	2.25	76.40	71.00	0.40	1,600	+	−	−	..
Dannemora	Tap in guard room, State prison	5/ 2/17	17	Trace	.....	.....	.008	.054	Trace	Trace	2.75	20.20	19.00	4.00	30	−	−	−	..
Dannemora	Tap, at barn, Adirondack Hotel, public supply	5/ 2/17	27	Trace	.....	.....	.010	.070	Trace	0.02	1.00	22.10	19.00	6.00	80	−	−	−	..
Dannemora	Tap in kitchen, State prison	5/ 2/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20	−	−	−	..
Dannemora	Tap, East Hall, State prison	5/ 2/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40	−	−	−	..
Delanson	Reservoir, public supply	7/27/17	30	15	.....	.....	.052	.418	Trace	.04	.75	47.10	42.00	9.40	600	+	+	+	..
Delmar	Tap, public supply	10/29/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	275	+	−	−	..

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ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as—				Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present, − = Absent)			
							Free ammonia	Albuminoid ammonia	Nitrites	Nitrates						10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Gowanda	Discharge of Fox spring, State hospital	2/14/17													10	−	−	−	..
Gowanda	Discharge of reservation spring into reservoir, State hospital	2/14/17	Trace	Clear			.038	0.02	.013	0.40	3.20	131.00		0.40	20	−	−	−	.
Gowanda	Discharge of Collins spring into reservoir, State hospital	2/14/17													25	−	−	−	..
Gowanda	Discharge of return water from laundry elevator, State hospital	2/14/17													20	−	−	−	..
Gowanda	Tap, at milk house, State hospital	2/14/17	Trace	clear			0.03	.082	.011	2.80	3.70	111.00		0.40	10	−	−	−	..
Gowanda	Tap at laboratory, State hospital	2/14/17													10	−	−	−	..
Grand Gorge	Brook above intake, public supply	8/27/17	20	5			.018	.165		.10	1.25	33.80	30.00	3.00	57,500	+	+	−	..
Grand Gorge	Tap, public supply	8/27/17	5	Trace			.093	.130		.10	1.25	35.10	30.00	3.10	600	+	+	−	..
Granville	Intake, before chlorination, public supply	11/ 8/17													300	+	+	−	..
Granville	Tap, pumping station, chlorinated water, public supply	11/ 8/17													20	−	−	−	..
Granville	Tap, at John Brayton's residence, chlorinated water, public supply	11/ 8/17													20	+	−	−	..
Granville	Tap, Mr. Menogue's residence, chlorinated water, public supply	11/ 8/17													30	−	−	−	..
Granville	Tap, Wm. Albone's residence, chlorinated water, public supply	11/ 8/17													20	−	−	−	..
Granville	Intake, chlorinated water, public supply	11/12/17		Trace			.006	.042		.40	1.40	71.40	63.00	1.50	100	+	+	+	..
Granville	Tap, at pumping station, public supply	11/12/17													5	−	−	−	..
Granville	Tap at John Brayton's residence, public supply	11/12/17													5	−	−	−	..
Granville	Tap at Patsey Minogue's, public supply	11/12/17													10	−	−	−	..
Granville	Tap at Wm. Albone's, public supply	11/12/17													5	−	−	−	..
Green Island	Raw water, public supply	7/ 3/17	55				.480	.160		.20	8.75	228.40	210.00	5.20	100	+	−	−	..
Green Island	Filtered and treated water, public supply	7/ 3/17													65	−	−	−	..
Greenville	Spring, public supply	10/15/17													4,700	+	+	+	..
Greenville	Reservoir, public supply	10/15/17													3,200	+	+	−	..
Greenville	Tap, public supply	10/15/17	10				.006	.058	.005	.06	.75	114.20	108.00	2.30	5,700	+	+	+	..
Halcottville	Tap, public supply	8/ 6/17					.006	.104		.20	.50	39.00	28.00	1.50	189,000	+	+	+	..
Hamilton	Intake, public supply	7/24/17													600	+	+	+	..
Hamilton	Influent to filter, public supply	7/24/17		Trace			.038	.120		.20	2.00	160.00	155.00	2.60	100	+	−	−	..
Hamilton	Filter effluent, public supply	7/24/17					.006	.032		.30	2.00	165.80	137.00	1.60	4,200	−	−	−	..

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ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as— Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present) (− = Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Kings Park	Tap from group I kitchen, Kings Park State Hospital	4/10/17													30	−	−	−	..
Kingston	Raw water, high service, public supply	10/16/17	10	5			.003	.034	Trace	.05	2.00	23.40	17.00	1.70	350	+	+	+	..
Kingston	Effluent filter No. 16, high service, public supply	10/16/17													70	+	+	+	..
Kingston	Filtered and sterilized, high service, public supply	10/16/17													70	+	+	+	..
Kingston	Tap, high service, public supply	10/16/17					.004	.036		.03	2.25	22.10	22.00	1.10	60	−	−	−	..
Kingston	Raw. low service, public supply	10/16/17	25	5			.004	.116	Trace	.02	1.50	24.70	20.00	2.40	900	+	+	−	..
Kingston	Filtered and sterilized, low service, public supply	10/16/17													85	−	−	−	..
Kingston	Tap, low service, public supply	10/16/17	10				.003	.036		.10	1.75	27.30	21.00	2.00	75	−	−	−	..
Lake Placid	Head of Lake Placid, public supply	6/16/17													40	−	−	−	..
Lake Placid	Intake, at Lake Placid, public supply	6/16/17													10	−	−	−	..
Lake Placid	Drinking Fountain, public supply	6/16/17													250	−	−	−	..
Lake Placid	Head of Lake Placid, public supply	9/14/17													30	−	−	−	..
Lake Placid	Water from West Lake, public supply	9/14/17													30	−	−	−	..
Lake Placid	Intake at Lake Placid, public supply	9/14/17													80	+	−	−	..
Lake Placid	Drinking fountain, public supply	9/14/17													100	−	−	−	..
Lake Kushaqua	Tap, before treatment by filtration, Stony Wold Sanatorium	12/11/17													50	−	−	−	..
Lake Kushaqua	Tap, after filtration, Stony Wold Sanatorium	12/11/17													5	−	−	−	..
Lake Kushaqua	Tap, Stony Wold Sanatorium	12/21/17	115	Trace			.022	.106		.050	.50	33.80	32.00	12.00					
Larchmont	Tap, public supply	4/18/17	17	2			.018	.136	Trace	Trace	6.75	35.10	19.50	3.30	1,800	−	−	−	..
Le Roy	Raw water, public supply	5/ 1/17	Clear	160			.024	.178	Trace	0.12	5.25	114.20	97.00	4.00	2,000	+	+	+	..
Le Roy	Filtered and treated water, public supply	5/ 1/17	Clear	Trace			.012	.109	Trace	Trace	5.25	128.60	93.00	3.00	30	−	−	−	..
Le Roy	Raw water, public supply	8/ 3/17	25	20			.536	.292	.020	.16	5.50	142.80	133.00	5.80	200	−	−	−	..
Le Roy	Tap, public supply	8/ 3/17					.023	.262		.70	5.50	151.40	123.00	4.30	500	−	−	−	..
Le Roy	Influent to filters, public supply	8/ 6/17													200	−	−	−	..
Le Roy	Clear well water, public supply	8/ 6/17													400	−	−	−	..
Liberty	Infiltration gallery, Loomis Sanatorium	8/28/17													950	+	+	−	..
Liberty	Brook, Loomis Sanitorium	8/28/17													750	+	+	+	..
Liberty	Reservoir, Loomis Sanitorium	8/28/17													200	−	−	−	..
Liberty	Tap, Loomis Sanitorium	8/28/17		10			.006	.224	Trace	.70	3.25	36.40	27.00	1.70	250	−	−	−	..

Lockport	Lockport canal water	4/ 2/17	39	128			.038	.24	.004	.02	5.50	97.10	87.00	13.60	21,500	+	+	+			
Lockport	Tap, at express office, public supply	4/ 2/17													10						
	Tap, at No. Tonawanda pumping station	4/ 2/17													20						
Lyons Falls	Beauty Spring, public supply	2/ 7/17	Trace	Clear			.014	.038	.002	0.18	0.50	36.40	42.00	0.40	20						
Machias	South inlet to collecting basin, public supply	9/ 6/17													2,300						
Machias	North inlet to collecting basin, public supply	9/ 6/17													3,750	+					
Madison	Spring supply, public supply	6/ 6/17					.08	.002		1.20	7.00	222.80	213.00	1.30	35						
Madison	Tap, South street, public supply	6/ 6/17													10						
Madison	Tap, North street, public supply	6/ 6/17													50						
Malone	Intake, main supply, public supply	5/ 2/17	Clear	Trace			.018	Trace	Trace	Trace	1.00	97.10	90.00	0.70	20						
Malone	Intake, Roaring Brook, public supply	5/ 2/17	20	Trace			.009	.026	Trace	Trace	1.50	52.90	45.00	3.80	220						
Malone	Tap, public supply	5/ 2/17													90						
Marlboro	Reservoir, public supply	9/24/17													750						
Marlboro	Tap, public supply	9/24/17													30						
Massena	Raw canal water, public supply	3/ 8/17													45						
Massena	Tap in office, public supply	3/ 8/17													20						
Massena	Tap in village, public supply	3/ 8/17													5						
Mechanicville	Raw impounding reservoir, public supply	6/20/17													100						
Mechanicville	Baker Brook, public supply	6/20/17													1,000						
Mechanicville	Influent to roughing filter, public supply	6/20/17	25	5			.012	.082		.06	1.75	160.00	137.00	4.10	900						
Mechanicville	Filter effluent, public supply	6/20/17	10				.012	.060		.10	1.75	162.80	134.00	3.50	80						
Mechanicville	Tap, public supply	6/20/17													350						
Menands	Tap, public supply	9/17/17													900						
Menands	Tap, public supply	9/29/17													600						
Menands	Tap, public supply	11/14/17													5,500						
Menands	Tap, public supply	12/11/17													70						
Millerton	Spring, public supply	1/18/17													25						
Millerton	Brook, public supply	1/18/17	Trace	Clear	154	141	.008	.026	.002	0.64	1.00	137.20	117.00	1.30	300						
Millerton	Well, public supply	1/18/17	Trace	Clear	192	142	.014	.004	.002	0.64	3.50	94.30	76.00	1.10	25						
Montour Falls	Tap, public supply	6/30/17	15	75			.270	.224	.010	.50	1.00	65.70	65.00	6.00	2,600						
Morrisville	Reservoir, public supply	4/10/17													1,100						
Morrisville	Tap, public supply	4/10/17	6	2	52	35	.008	.051	.002	0.04	1.25	31.20	31.00	3.10	500						
Mt. Kisco	Mt. Kisco Brook, public supply	1/ 1/17													1,300						
Mt. Kisco	Tap at pumping station, public supply	1/ 1/17													25						
Mt. Kisco	Tap, at pumping station, public supply	1/ 1/17	5	Trace			.014	.150	.001	0.20	3.50	28.60	21.00	1.70	45						
Mt. Morris	Raw water, public supply	1/10/17													30						
Mt. Morris	Filtered water, public supply	1/10/17	5	Trace			.008	.170	.003	0.16	3.50	78.60	73.00	3.20	20						
Mt. Morris	Old supply, public supply	1/10/17	3	2	249	225	.078	.079	.003	0.80	3.75	221.50	176.00	1.40							
Mt Morris	Raw water, public supply	2/ 7/17	5	Clear			.068	.162	.012	0.18	4.00	67.10		2.20	45						
Mt. Morris	Filtered water, public supply	2/ 7/17	5	Clear			.018	.158	.006	0.14	4.25	80.00	77.00	2.60	250						
Mt. Upton	Spring, public supply	4/13/17													40						
Mt. Upton	Tap, spring, public supply	4/13/17	Clear	Trace			.001		.002	Trace	0.25	46.40	20.00	0.80	10						
Mt. Vernon	Tap, 655 Lafayette ave., public supply	3/15/17													20						
Mt. Vernon	Tap, 646 Lafayette ave., public supply	3/15/17													10						
Mt. Vernon	Tap, 250 Lorraine ave., public supply	3/15/17													10						
Newark	Tap, on spring supply, New York State Custodial Asylum for Feeble-Minded Women	6/ 7/17					.010			0.60	7.00	7.29	210.00	1.80	40						

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as— Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present) (− = Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Newark	Overflow of spring, New York State Custodial Asylum for Feeble-Minded Women	6/ 7/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	+	+	−	..
Newark	Tap on surface supply, New York State Custodial Asylum for Feeble-Minded Women	6/ 7/17	25	150	.....	.....	.058	.284	.030	0.80	12.00	262.80	139.00	7.70	7,000	+	+	−	..
Newburgh	Raw water at intake, public supply	3/ 8/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,000	+	+	−	..
Newburgh	Tap, at 129 Broadway, treated water, public supply	3/ 8/17	32	3	.....	.....	0.124	0.298	.018	.18	3.00	50.00	30.00	5.20	15	−	−	−	..
Newburgh	Raw water, public supply	3/ 8/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	300	+	−	−	..
Newburgh	Tap, at Wisner ave. and Broadway, treated water, public supply	3/ 8/17	35	Trace	.....	.....	.032	.176	.002	0.02	2.75	39.70	34.00	6.00	79	+	+	−	..
Newburgh	Tap, City Hall, treated water, public supply	3/ 8/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	550	+	−	−	..
New York city	Manhattan State Hospital	3/23/17	6	.....	60	38	.009	.066	Trace	0.20	3.75	42.30	37.00	2.50	70	−	−	−	..
North Collins	Tap, public supply	2/ 2/17	Trace	2	.....	.....	.008	.036	.01	3.52	3.75	48.60	20.00	0.20	.....	.....	.....	.....	.....
North Creek	Pond, auxiliary supply, public supply	4/21/17	3	Trace	50	35	.023	.071	Trace	Trace	2.25	20.20	14.00	2.90	375	−	−	−	..
North Creek	Tap, public supply	4/21/17	5	Trace	23	12	.006	.037	Trace	Trace	.375	12.70	6.00	4.20	3,000	−	−	−	..
North Creek	Hudson river water, public supply	4/21/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,200	+	+	+	..
Nunda	Reservoir, public supply	8/ 3/17	5	Trace	.....	.....	.034	.040	.001	.70	3.00	140.00	135.00	1.40	200	+	+	−	..
Nunda	Sager Spring, public supply	8/ 3/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22,500	+	+	−	..
Nunda	Spring, auxiliary supply	8/ 3/17	.....	.....	.....	.....	.002	.016	.....	1.60	10.00	245.60	205.00	.80	5,300	+	+	+	..
Nunda	Bradley spring, public supply	8/ 3/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	85,000	+	+	+	..
Ogdensburg	Tap, St. Lawrence State Hospital	5/ 4/17	.....	.....	600	.....	.024	.042	.....	.10	9.50	82.90	.....	2.10	20	−	−	−	..
Olean	Tap, 332 North 3d street, public supply	2/ 7/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	−	−	−	..
Olean	Tap, City Hall, filtered water, public supply	2/ 7/17	Trace	Clear	.....	.....	Trace	0.03	.003	0.18	11.20	186.00	147.00	0.50	35	−	−	−	.
Olean	Tap, public supply	6/ 6/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24,000	+	−	−	..
Olean	Creek, proposed supply, public supply	7/12/17	30	25	.....	.....	.030	.130	.004	.20	2.00	47.10	41.00	4.20	3,200	+	+	+	..
Olean	Tap, at pumping station, public supply	7/12/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,300	+	+	+	..
Olean	Tap, in city, public supply	7/12/17	.....	Trace	.....	.....	.004	.028	.....	.30	11.75	148.60	146.00	1.90	100	+	−	−	..
Olean	Water from city line, public supply	7/30/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36,000	−	−	−	..
Oriskany Falls	Reservoir, public supply	7/24/17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,900	+	+	−	..
Oriskany Falls	Tap, public supply	7/24/17	.....	.....	.....	.....	.006	.016	.....	1.00	2.25	245.60	230.00	.30	12,000	−	−	−	..
Oxford	Well to be used as auxiliary supply, public supply	4/27/17	2	15	.....	.....	.081	.080	Trace	Trace	9.00	43.70	.....	0.90	35	−	−	−	..

Oxford	Tap, Dr. Hall's residence, public supply	4/27/17														45	—		—	
Oxford	Tap, public supply	4/27/17	Clear	Trace			.007	.002	Trace	Trace	3.75	41.00	37.00	0.20						
Oxford	Springs, Women's Relief Corps Home	6/ 6/17					.06			.10	1.75	27.30	18.00	2.00	5,600	—	—	—	—	
Oxford	Well, Women's Relief Corps Home	6/6 /17		5			.06			.50	1.75	47.10	45.00	1.00						
Oxford	Railroad tank, Women's Relief Corps Home	9/10/17														25	+	—	—	
Oxford	Well, Women's Relief Corps Home	9/10/17		80			.004	.010	.005	.30	3.00	72.90		1.00		50	+	—	—	
Oxford	Springs, Women's Relief Corps Home	9/10/17														350	+	—	—	
Pawling	Tap, public supply	3/21/17	20	5			.177	.112	Trace	0.02	3.00	59.20	53.00	4.80						
Pawling	Tap, public supply	3/28/17	9				.115	.116	.003	0.02	2.50	45.70	43.00	5.30	210	—	—	—	—	
Pawling	Tap, public supply	4/25/17	5	Trace			.013	.084	Trace	Trace	2.37	60.00	57.00	2.79	170	—	—	—	—	
Peekskill	Raw water, public supply	6/ 1/17	45	2			.042	.126	Trace	.10	2.50	32.50	31.00	6.40	3,600	+	+	—	—	
Peekskill	Tap, public supply	6/ 1/17	25	Trace			.01	.052	Trace	.16	2.50	36.40	32.00	4.80	900	+	+	—	—	
Peekskill	Raw water, public supply	7/12/17	35	2			.010	.186	.005	.01	2.75	44.30	41.00	4.40	600	+	+	+	—	
Peekskill	Filtered water, public supply	7/12/17	15	Trace			.004	.056		.16	2.75	51.40	45.00	1.70	35	—				
Petersburg	Little Hoosick river, southerly branch, public supply	4/12/17													375	+	—	—	—	
Petersburg	Little Hoosick river, northerly branch, public supply	4/12/17													25	—	—	—	—	
Petersburg	Pump, near well, public supply	4/12/17													40	—	—	—	—	
Petersburg	Tap, public supply	4/12/17	Clear	Trace			.006	.028	.001	Trace	1.50	20.80	9.00	1.50	70	—	—	—	—	
Pittsford	Tap, public supply	9/11/17													90	—	—	—	—	
Plattsburgh	Tap, public supply	2/14/17	10	Trace			.014	.056	.007	0.10	1.50	131.40	128.00	1.10	60	—	+	—	—	
Plattsburgh	Distributing reservior, public supply	5/ 3/17	15	3			.036	.104	Trace	0.02	1.25	58.60	52.00	5.20	90	+	+	—	—	
Plattsburgh	Distributing reservoir, public supply	7/11/17	25	Trace			.026	.166	.002	.04	1.00	81.40	79.00	4.70	600	—	—	—	—	
Plattsburgh	Scribner's Pond, untreated water, public supply	7/24/17	25				.04	.142	.003	.10	.75	114.20	113.00	3.70	250	+	+	—	—	
Plattsburgh	Tap, treated water, public supply	7/24/17	20	4			.02	.114	.003	.08	.75	100.00	98.00	3.70	220	—	+	—	—	
Plattsburgh	Scribner's pond, public supply	8/15/17	5	Trace			.078	.102	.003	.16	.50	134.20	131.00	2.70	200	+	+	—	—	
Plattsburgh	Reservoir, West brook, public supply	8/15/17	15	2			.014	.204	.002	.02	.50	94.20	88.00	4.90	100	+	+	—	—	
Plattsburgh	Distributing reservoir, public supply	8/15/17													250	+	+	—	—	
Plattsburgh	Cumberland Bay Bathing Beach	8/20/17	30	20			.094	.160	Trace	.08	2.75	51.40	45.00	7.10	3,800	+	+	+	—	
Plattsburgh	Scribner Pond, untreated water, public supply	9/27/17	15	Trace			.014	.088		.24	1.50	122.80	120.00	3.20	230	+	+	+	—	
Plattsburgh	Distributing reservoir, treated water, public supply	9/27/17	30	5			.026	.130		.06	1.75	102.80	98.00	5.20	550	+	+	—	—	
Pleasantville	Tap, public supply	1/18/17	Trace	Clear			.016	.050	.002	0.24	3.75	174.20	103.00	1.00	20	—	—	—	—	
Port Chester	Reservoir, near gate house, public supply	12/27/17													500	+	—	—	—	
Port Chester	Tap, No. 602 North Main street, public supply	12/27/17													230	+	—	—	—	
Port Chester	Tap, No. 30 North Main street, public supply	12/27/17													240	+	—	—	—	
Port Chester	Tap, Bolt Works, Midland ave., public supply	12/27/17													250	+	+	—	—	
Port Chester	Tap, 136 Smith street, public supply	12/27/17													120	+	+	—	—	
Potsdam	Barton Brook, 9.20 A. M., public supply	4/17/17	12	Trace	63	42	.022	.062	Trace	.020	1.50	75.70	58.00	3.00	325	+	+	—	—	
Potsdam	Barton Brook, 10 A. M., public supply	4/17/17													130	+	+	—	—	
Potsdam	Raquette river, public supply	4/17/17	40	Trace			.006	.069	Trace	0.05	1.25	14.30	14.00	6.80	500	+	+	—	—	
Prattsburg	Edge of reservoir, public supply	10/17/17													2,600	+				

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as— Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present) (− = Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Prattsburg	Stream, 4 rods from reservoir, public supply	10/17/17													3,200	+	+	−	..
Prattsburg	Tap, public supply	10/17/17	20	4			.008	.070	Trace		1.75	45.70	44.00	2.00					
Randall's Island	Tap, House of Refuge	1/ 1/17	5	2			.008	.072	.003	0.10	2.25	40.30	40.00	2.70	15	+	−	−	..
Ray Brook	Mountain stream	4/27/17	10	Trace			.044	.049	Trace	0.02	0.50	14.30	7.00	4.20	30	+	−	−	..
Ray Brook	Reservoir, New York State Hospital for Incipient Pulmonary Tuberculosis	10/28/17													20	+	+	−	..
Ray Brook	Tap in laboratory, New York State Hospital for Incipient Pulmonary Tuberculosis														1,900	+	+	+	..
Ray Brook	Tap, in drug room, New York State Hospital for Incipient Pulmonary Tuberculosis														275	+	+	+	..
Ray Brook	Tap, New York State Hospital for Incipient Pulmonary Tuberculosis	10/28/17	30	10			.010	.084		.40	1.50	23.40	8.00	8.90					
Rensselaer	Raw Hudson river water, public supply	3/23/17	18	15			.062	.132	.01	0.12	3.75	56.40	47.50	9.00	13,000			+	+
Rensselaer	Influent to filter No. 5, chlorinated, public supply	3/23/17													40	−	−	−	..
Rensselaer	Effluent, from filter No. 5, public supply	3/23/17													10	−	−	−	..
Rensselaer	Tap at pumping station, public supply	3/23/17	Trace	Clear			.078	.050	.01	0.12	4.95	56.40	34.00	4.70	10	−	−	−	..
Rensselaerville	Creek, at intake, public supply	10/15/17													500	+	+	−	..
Rensselaerville	Tap, public supply	10/15/17	15				.008	.134	.005	.04	1.50	29.90	26.00	4.20	200	+	−	−	..
Rochester	Raw Lake Ontario water, R. & L. O. Water Co., public supply	9/13/17	5	2			.010	.080	Trace	.06	9.00	108.60	96.00	1.70	250	+	−	−	..
Rochester	Basin influent, public supply	9/13/17													15	−	−	−	..
Rochester	Basin effluent, public supply	9/13/17		2			.006	.058		.06	9.50	108.60	95.00	.90	30	−	−	−	..
Rochester	Filter effluent, public supply	9/13/17					.010	.062		.06	9.25	108.60	96.00	1.10	20	−	−	−	..
Rochester	Tap, No. 4419 Lake ave., R. & L. O. Water Co., public supply	9/13/17													45	−	−	−	..
Rochester	Tap, 1513 Lake ave., city supply	9/13/17													45	−	−	−	..
Rome	Well, Brush farm, New York State Custodial Asylum	1/18/17	Trace	Clear	290	230	.008	.016	.002	2.00	7.25	221.50	200.00	1.10	25	−	−	−	..
Rome	Pump at Stock farm, New York State Custodial Asylum	1/18/17	Trace	Clear	260	232	.016	.018	.001	0.44	0.75	228.50	201.00	0.90	15	+	−	−	..
Rome	Tap, on supply used for bathing, New York State Custodial Asylum	1/18/17													15			−	..

Rome	Fish Creek dam, untreated water, public supply	3/31/17	22	Trace			.013	.048	.002	.02	0.50	19.50	19.00	3.70	3,600	+	+	−		
Rome	Tap, treated water, City Hall, public supply	3/31/17													10	−	−	−		
Rome	Tap, police station, public supply														500	−	−	−		
Rome	Tap, "A," public supply	5/ 4/17	45		40	24	.056	.050	.001	.75	.75	19.50	14.00	6.80	40	−	−	−		
Rome	Tap, Charles Anker, public supply	6/16/17													275	+	−	−		
Rome	Untreated water, meter house, public supply	6/16/17													2,200	+	+	−		
Rome	Tap, Chamber of Commerce, public supply	6/16/17													2,400	+	−	−		
Rome	Untreated water, meter house, public supply	7/26/17													6,600	+	+	−		
Rome	Tap at Borthwick's, treated water, public supply	7/26/17													50	−	−	−		
Sag Harbor	Dug well, Sag Harbor Water Co., public supply	6/28/17	35		43		.02	.214	.015	.02	9.00	11.10	11.00	5.20	400	+	+	+		
Sag Harbor	Dug well, Sag Harbor Water Co., public supply	8/13/17		70			.058	.112	Trace	.06	8.00	23.40	22.00	3.20	1,800	+	+	+		
Salem	Tap from excavated well, public supply	7/31/17					.004	.010		.40	2.00	61.40	53.00	.30	50	−	−	−		
Salem	Tap, spring water, public supply	7/31/17					.008	.018		.20	1.50	29.90	25.00	.30	150	−	−	−		
Salem	Pump, driven well, public supply	7/31/17					.002	.002		.50	2.00	54.30	51.00	.10	100	−	−	−		
Saratoga	Loughberry Lake, public supply	1/16/17													15	−	−	−		
Saratoga	Tap, Loughberry supply, public supply	1/16/17	5	Trace			.072	.030	.005	0.16	1.50	77.10		2.50	10	−	−	−		
Saratoga	Tap, Loughberry supply, public supply	6/25/17					.02	.068		.10	2.00	65.70	63.00	2.30	200	+	−	−		
Saratoga	Tap, Delaware & Hudson, Loughberry supply, public supply														400	+	−	−		
Scarsdale	Tap, New York Suburban Water Co., of North Tarrytown, public supply	2/ 8/17	5	2			.062	0.13	.002	0.20	4.75	44.30	20.50	3.20	100	−	−	−		
Scarsdale	Tap, Consolidated Water Co., North Tarrytown, public supply	11/23/17					.014	.132		.60	11.60	77.10	46.00	3.60	15	−	−	−		
Scotia	Tap, pumping station, public supply	5/18/17					.01	.008		.60	4.00	102.80	95.00	1.30	5	−	−	−		
Silver Spring	Cook Spring, public supply	8/ 3/17													24,000	+	+	+		
Silver Spring	Tap, reservoir supply, public supply	8/ 3/17					.006	.080		.24	2.50	165.80	161.00	2.70	800	+	+	+		
Silver Spring	Artesian well, public supply	8/ 3/17			277		.334	.026		.02	16.00	211.60	208.00	1.20	50	−	+	+		
Slingerland	Storage Reservoir, Slingerland Suburban Water Co. No. 5	10/29/17													2,000	−	−	−		
Slingerland	Albright cold spring, Slingerland Suburban Water Co	10/29/17					.014	.016		1.20	3.00	137.20	133.00	.40	10	−	−	−		
Slingerland	Helderberg spring, Slingerland, Suburban Water Co						.010	.028		.70	2.50	175.80	173.00	.60	600	+	+	+		
Sonyea	Creek, Craig Colony	8/ 8/17	10	70			.010	.104	.005	.02	7.75	211.60	177.00	2.60	9,800	+	+	+		
Sonyea	Spring, treated water, Craig Colony	8/ 8/17					.518	.040	0.20	.70	21.00	325.00	264.00	1.30	900	+	+	−		
Sonyea	Creek, Craig Colony	10/ 3/17	5	Trace			.010	.034		.02	8.00	182.00	174.00	1.40	2,400	−	+	−		
Sonyea	Spring, Craig Colony	10/ 3/17					.004	.036	.400	1.20	24.00	335.50	284.00	1.20	25	−	+	−		
Springwater	Tap, public supply	9/ 6/17	10	30			.014	.102	.003	.30	2.00	97.20	96.00	3.10	33,500	+	+	+		
Stamford	Raw water, public supply	7/30/17	15	2			.032	.092	Trace	.30	1.25	31.20	22.00	2.00	200	+	+	−		
Stamford	Filtered water, public supply	7/30/17	5	Trace			.004	.050		.30	1.25	39.00	30.00	1.70	1,500	+	+	−		
South Glens Falls	Tap, Dr. Dolan's office, public supply	6/11/17	15				.012	.032		.50	1.50	27.30	21.00	4.60	3,600	+	+	+		

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as— Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present) (− = Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
South Glens Falls	Tap, Mr. Moor's residence, public supply	6/11/17													350	+	+	−	..
South Glens Falls	Drinking fountain, public supply	6/11/17														+	+	+	..
South Glens Falls	Tap, Mr. Traver's residence, public supply	6/11/17													300	+	+	+	..
South Glens Falls	Baker Brook, public supply	7/ 3/17													6,700	+	+	+	..
South Glens Falls	Tap, Mr. Wetsel residence, public supply	7/ 3/17													3,500	+	−	−	..
South Glens Falls	Tap, public supply	7/ 3/17													4,700	+	−	−	..
South New Berlin	Owens spring, catch basin, public supply	7/26/17													23,700	−	−	−	..
South New Berlin	Graves spring, public supply	7/26/17													7,600	+	+	−	..
South New Berlin	Well, auxiliary supply Water Co., public supply	7/26/17					.094	.004		.02	34.00	117.20	117.00	.40	39,000	−	−	−	..
South New Berlin	Borden well, auxilary supply, public supply	7/26/17													50	+	−	−	..
South New Berlin	Tap, public supply	7/26/17					.004	.014		.70	2.50	27.30	26.00	.50	21,000	−	−	−	..
Syracuse	Tap, main kitchen, State institution for feeble-minded children	1/20/17	Trace	Clear			.004	.028	.002	0.40	2.00	120.00	92.00	1.20	10	−	−	−	..
Syracuse	Tap, main building at Fairmont farm, State institution for feeble-minded children	1/20/17	Trace	Clear	970	825	.008	.016	.003	3.20	3.25	743.00	226.00	0.80	550	+	−	−	..
Syracuse	Tap, at pump at main supply, Fairmont farm, State institution for feeble-minded children	1/20/17													45	−	−	−	..
Syracuse	Well at Teamsters, State institution for feeble-minded children	1/20/17	Trace	Clear	1,065	910	.004	.024	.005	3.00	3.25	714.00	269.00	0.60	10	−	−	−	..
Thiells	North stream entering reservoir, Letchworth village	3/28/17													300	+	−	−	..
Thiells	South stream entering reservoir, Letchworth village	3/28/17													350	−	−	−	..
Thiells	Well at Cole farm, Letchworth village	3/28/17	Trace	Clear			.014	.023	.002	Trace	3.75	91.40	92.00	0.40	100	+	−	−	..
Thiells	Tap in administration building, Letchworth village	3/28/17	11				.017	.052	Trace	0.02	2.37	20.80	10.00	3.20	450	−	−	−	..
Ticonderoga	Lake George, public supply	7/24/17		Trace			.004	.080	.002	.02	1.50	36.40	33.00	1.80	33,500	−	−	−	..
Tully	Well, public supply	1/ 1/17	Trace	Trace			.004	.032	.001	2.40	10.25	257.00	240.00	0.60					..
Tully	Well, public supply	1/ 8/17													45	+	+	+	..

Unadilla	Tap, ladies' room, D. & H. R. R. Station, public supply	7/ 3/17													3,700	+	+	+	..
Unadilla	Tap, men's room, D. & H. R. R. Station, public supply	7/ 3/17													2,200	+	+	+	..
Unadilla	Tap, E. Houch, Kilkenny supply, public supply	7/ 3/17		5			.028	.068	.002	.06	.50	22.10	21.00	1.40	1,300	—	—	—	..
		7/ 3/17													1,900	+	+	+	..
Unadilla	Water tank, D. & H. R. R., public supply	7/ 4/17	25	5			.012	.152	.002	.02	.50	22.10	22.00	3.90					
Unadilla	Martin brook reservoir, public supply																		
Unadilla	Kilkenny distributing reservoir, public supply	7/ 4/17		Trace			.008	.036		.06	.50	23.40	20.00	1.70					
Utica	Tap, Woodside Farm, State hospital	1/17/17	Trace	Clear	44	30	.064	.024	.001	1.00	1.75	19.50	8.00	0.70	45	+	+	—	..
Utica	Tap, Overlea Farm, State hospital	1/17/17	Trace	Clear	180	138	.092	.034	.003	5.60	4.88	88.60	74.00	1.90	1,200	+	—	—	..
Utica	Tap, main building, State hospital	1/17/17													15	—	—	—	..
Utica	Main supply, State hospital	1/17/17	Trace	Clear	255	225	.082	.040	.001	2.40	4.88	208.00	177.00	1.00	40	+	—	—	..
Utica	Raw water, Marcy reservoir, public supply	2/ 7/17	20	5	65	41	.072	.108	.002	0.34	0.50	22.10	16.00	6.40	50	—	—	—	..
Utica	Treated water, Marcy reservoir, public supply	2/ 7/17													75	—	—	—	..
Utica	Raw water, Deerfield reservoir, public supply	2/ 7/17													80	+	+	—	..
Utica	Treated water, Deerfield reservoir, public supply	2/ 7/17													40	—	—	—	..
Utica	Raw water, Southern watershed, public supply	2/ 7/17	12	2	90	62	.030	.080	.003	0.16	1.50	60.00	56.00	4.30	90	+	—	—	..
Utica	Tap, Southern watershed, public supply	2/ 7/17													15	—	—	—	..
Utica	Tap, Hotel Utica, Deerfield water, public supply	2/ 9/17													5	—	—	—	..
Utica	Tap, 1009 Stork street, public supply	2/ 9/17													11	—	—	—	..
Utica	Tap, 1024 Western avenue, public supply	2/ 9/17													8	—	—	—	..
Utica	Tap, 906 Stork street, public supply	2/ 9/17													70	+	—	—	..
Utica	Tap, 818 Varick street, public supply	2/ 9/17													11	—	—	—	..
Utica	Tap, 644 Eagle street, public supply	2/ 9/17													46	—	—	—	..
Utica	Tap, St. Luke's hospital, Marcy supply, public supply	2/ 9/17													14	—	—	—	..
Utica	Tap, Court and West streets, Marcy supply, public supply	2/ 9/17													13	—	—	—	..
Utica	Tap, 1304 West avenue, public supply	2/ 9/17													60	+	—	—	..
Utica	Tap, 1208 Stork street, public supply	2/ 9/17													70	+	—	—	..
Utica	Tap, raw water on pump, West End Brewing Co., public supply	2/19/17	35	10			.224	0.73	.030	1.00	12.00	195.00	182.00	5.00	1,200	+	+	+	..
Utica	Filter effluent, West End Brewing Co., public supply	2/19/17													1,100	+	+	+	..
Utica	City water from new cross connection, West End Brewing Co., public supply	2/19/17													10	—	—	—	..
Utica	Erie canal, Utica Knitting Mill, public supply	2/19/17	25	12			0.75	2.58	.024	0.80	7.00	215.00	194.00	6.00	1,600	+	+	+	..
Utica	Erie canal, east of Genesee street, near Third avenue, public supply	2/19/17	50	20			0.60	0.58	.060	0.06	21.00	188.00	180.00	13.20	24,500	+	+	+	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as— Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present) (− = Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Utica	Raw water, Deerfield reservoir, public supply	5/29/17	25	5			.010	.068	Trace	.4	1.00	20.80	13.00	5.50					
Utica	Reservoir No. 4, public supply	5/29/17	25	5			.026	.064	Trace	.04	1.50	45.70	38.00	8.50					
Utica	Tap, 80 rods below Deerfield reservoir, public supply	5/29/17													20	−	−	−	..
Utica	Tap, D., L. & W. R. R. coach, public supply	5/29/17													30	−	−	−	..
Utica	Tap, 80 rods below reservoir after chlorination, public supply	5/29/17													10	−	−	−	..
Utica	Tap, West avenue and Green street, public supply	5/29/17													10	−	−	−	..
Utica	Raw water, reservoir No. 4, public supply	10/ 9/17	50	10			.026	.092	.010	.06	2.25	57.10	52.00	2.60	250	+	+	−	..
Utica	Tap, 1426 Elm street, public supply	10/ 9/17													70	+	−	−	..
Utica	Tap, 111 Grove place, public supply	10/ 9/17													10	+	−	−	..
Valatie	Tap, North building, N. Y. State Farm for women	2/ 9/17	2	Clear			.034	.072	.005	3.20	7.00	41.60	18.00	1.10	15	−	−	−	..
Valatie	Pump, main supply of south building, New York State Farm for Women	2/ 9/17	1	Clear			.070	.042	.002	.70	3.20	40.30	38.00	0.50	10	−	−	−	..
Valatie	Well near barn, N. Y. State Farm for Women	2/ 9/17	2	Clear			.088	.042	.013	3.00	4.50	54.30	36.00	0.40	15	−	−	−	..
Valatie	Spring, near Warden's residence, N. Y State Farm for Women	2/ 9/17	1	Trace			.010	.070	.003	2.20	5.50	47.10	26.00	0.40	45	+	+	+	..
Wanekena	Spring, public supply	9/25/17	40				.006	.092	.005	.20	1.00	16.90	16.00	7.70	3,700	+	+	−	..
Wanekena	Pipe, public supply	9/25/17	20				.010	.026	.005	.40	1.25	24.70	24.00	2.80	1,600	+	+	−	..
Warsaw	Durcher reservoir, West hill, public supply	8/ 2/17					.020	.136	.008	.60	3.50	74.30	71.00	3.50	100	−	−	−	..
Warsaw	Tap, Rock Glen supply, public supply	8/ 2/17					.004	.030		.70	3.50	125.80	122.00	1.60	2,800	+	−	−	..
Warwick	Tap, public supply	11/26/17													15	+	−	−	..
Waterford	Tap, public supply	5/23/17					.012	.050		.10	2.75	37.70	14.00	8.70	25	+	−	−	..
Waterford	Raw water, public supply	6/21/17	40	1			.012	.138		.06	1.75	28.60	25.00	15.50	800	+	+	+	..
Waterford	Effluent, coagulating basin, public supply	6/21/17													200	+	+	+	..
Waterford	Filter, effluent before chlorination, public supply	6/21/17													35	+	+	−	..

Waterford	Filter, effluent after chlorination, public supply	6/21/17					.028	.052		.06	2.50	39.00	16.00	4.50	5	−		−		−			
		4/10/17	5	5			.022	.047	Trace	Trace	1.75	26.00	19.00	2.20	1,300	+	−	−	−	−	+	..	..
Waterville	Old reservoir, public supply	4/10/17	Clear	Trace	51	36	.019	.023	Trace	Trace	0.50	162.50	158.00	.60	230	−	−	−	−	−	+	..	..
Waterville	New reservoir, public supply	4/10/17													35	−	−	−	−	−	+	..	..
Waterville	Tap, public supply	7/ 3/17													190	+	+	+	+	+	+	..	..
Watervliet	Reservoir, public supply	7/ 3/17													190	+	+	+	+	+	+	..	..
Watervliet	Tap, 409 16th street, public supply	7/ 3/17													200	+	+	+	+	+	+	..	..
Watervliet	Tap, 1415 First avenue, public supply	7/ 3/17													400	+	+	+	+	+	+	..	..
Watervliet	Raw, Mohawk river water, public supply	7/ 7/17																					
Watervliet	Tap at pump, Mohawk river water, chlorinated, public supply	7/ 7/17													100	+		−		−		..	..
Watervliet	Tap, Broadway and 19th street, public supply	7/ 7/17													100	+		−		−		..	..
		9/17/17													66,000	+		+		+		..	..
Watervliet	Raw Hudson river water, public supply	9/17/17	35	8			.110	.261	.015	.25	6.00	89.00	75.00	13.70	55,000	+		+		+		..	..
Watervliet	Hudson river water, chlorinated, public supply	9/17/17													550	+		+		−		..	..
Watervliet	Raw Mohawk river water	9/17/17	35	10			.040	.170	.010	.30	6.00	91.45	87.00	9.20	100	+		−		−		..	..
Watervliet	Pumping station, chlorinated, Dunsbach Ferry, public supply	9/17/17													6,600	+		+		+		..	..
		9/17/17													33,000							+	+
Watervliet	Tap, public supply	9/20/17																					
Watervliet	Raw Hudson river water, public supply	9/20/17													25,000	+		+		+		..	..
Watervliet	Hudson river, chlorinated discharge line, public supply	9/20/17													450	+		+		+		..	..
Watervliet	Raw Mohawk river water, public supply	9/20/17													50	−		−		−		..	..
Watervliet	Mohawk river water, chlorinated, public supply	9/20/17													56,000							+	+
		9/21/17																					
Watervliet	Raw Hudson river water, public supply	9/21/17													5,200	+		+		+		..	..
Watervliet	Hudson river water, chlorinated, public supply	9/21/17													320	+		+		−		..	..
Watervliet	Raw Mohawk river water, public supply	9/21/17													30	−		−		−		..	..
Watervliet	Mohawk river water, chlorinated, public supply	9/21/17													10,500							+	+
		9/22/17																					
Watervliet	Raw Hudson river water, public supply	9/22/17													15	−		−		−		..	..
Watervliet	Hudson river water, chlorinated, public supply	9/22/17													120	+		+		−		..	..
Watervliet	Well, Third avenue and 14th street, public supply	9/24/17					.008	.026	.....	2.00	37.00	214.50	151.00	.80	1,500	+		+		+		..	..
Watervliet	Well, 13th street and Second avenue, public supply	9/24/17					.012	.090	.004	6.40	40.00	171.40	102.00	1.90	20,000							+	+
		9/24/17																					
Watervliet	Raw Hudson river water, public supply	9/24/17													100	−		−		−		..	..
Watervliet	Hudson river water, chlorinated, public supply	9/24/17													450	+		+		−		..	..
Watervliet	Raw Mohawk river water, public supply	9/24/17													40	−		−		−		..	..
Watervliet	Mohawk river water, chlorinated, public supply	9/24/17												26.40	7,000							−	−
		9/25/17																					
Watervliet	Raw Hudson river water, public supply	9/25/17													20	−		−		−		..	..
Watervliet	Hudson river water, chlorinated, public supply	9/25/17												11.60	325	+		+		−		..	..
Watervliet	Raw Mohawk river, public supply	9/25/17																					

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as—				Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present) (− = Absent)			
							Free ammonia	Albuminoid ammonia	Nitrites	Nitrates						10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Watervliet	Mohawk river water, chlorinated, public supply	9/25/17													40	−	−	−	−
Watervliet		9/26/17													15,000			+	+
Watervliet	Raw Hudson river water, public supply														10	−	−	−	..
Watervliet	Hudson river water, chlorinated, public supply	9/26/17													325	+	+	+	..
Watervliet		9/26/17													30	−	−	−	..
Watervliet	Raw Mohawk river water, public supply														9,500			+	+
Watervliet	Mohawk river water, chlorinated, public supply	9/26/17													25	−	−	−	..
Watervliet		9/27/17													260	+	+	+	..
Watervliet	Raw Hudson river water, public supply														35	−	−	−	..
Watervliet	Hudson river water, chlorinated, public supply	9/27/17													29,500			+	+
Watervliet		9/27/17													750	+	+	+	..
Watervliet	Raw Mohawk rive rwater, public supply														30	+	+	−	..
Watervliet	Mohawk river water, chlorinated, public supply	9/27/17												33.20	29,500			+	+
Watervliet	Raw Hudson river water, public supply	9/28/17													375	+	+	+	..
Watervliet	Hudson river water, chlorinated, collected at 3:40 P. M.	9/28/17												9.60	20	−	−	−	..
Watervliet	Hudson river water, chlorinated, collected at 4:45 P. M.	9/28/17												10.00	61,000			+	+
Watervliet	Raw Mohawk river water, public supply	9/28/17													200	+	+	+	..
Watervliet	Mohawk river water, chlorinated, public supply	9/29/17												29.60	38,000			+	+
Watervliet	Raw Hudson river water, public supply	9/29/17												28.80	80	+	+	−	..
Watervliet	Hudson river, chlorinated, public supply	10/ 1/17																	
Watervliet	Well, Broadway and 14th street, public supply	10/ 1/17	15	3			.050	.040	.003	6.40	32.00	188.50	181.00	1.30	500	+	+	−	..
Watervliet	Well, Broadway and 1st street, public supply	10/ 1/17					.004	.026	Trace	4.00	21.00	134.20	112.00	.90	700	+	+	+	..
Watervliet	Well, 13th street, near Fifth avenue, Watervliet, public supply	10/ 1/17	5	4			.040	.052	.020	2.50	45.00	228.50	171.00	1.90	2,900	+	+	+	..
Watervliet	Well, Seventh avenue, near 16th street, Watervliet	10/ 1/17		Trace			.818	.038	Trace	1.00	59.00	257.00	210.00	2.30	500	+	+	+	..

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ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as—				Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present) (− = Absent)			
							Free ammonia	Albuminoid ammonia	Nitrites	Nitrates						10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Watervliet	Hudson river water, chlorinated, public supply	10/18/17													20	−	−	−	..
Watervliet	Raw Mohawk river water, public supply	10/18/17													1,900	+	+	+	..
Watervliet	Mohawk river water, chlorinated, public supply	10/18/17													10	−	−	−	..
Watervliet	Well, Third avenue and 23d street, public supply	10/18/17	10	3			.144	.040	.003	4.00	110.00	264.50	238.00	1.00	20	+	+	−	..
Watervliet	Well, Fourth avenue and 24th street, public supply	10/18/17					1.29	.020	.005	4.00	120.00	285.50	230.00	.70	10	−	−	−	..
Watervliet	Well, Sixth avenue, near 19th street, public supply	10/18/17					.012	.078	Trace	12.00	86.00	214.50	121.00	1.20	70	+	+	−	..
Watervliet	Raw Hudson river water, public supply	10/23/17													2,600			+	+
Watervliet	Hudson river water, chlorinated, public supply	10/23/17	5	1			.208	.286	.008	.10	5.50	70.00	65.00	21.20	30	−	−	−	..
Watervliet	Tap, No. 1283 Second avenue, public supply	10/23/17	4	1			.042	.198	.010	.30	5.50	74.30	73.00	12.00	850	−	−	−	..
Watervliet	Mohawk river water, chlorinated, public supply	10/23/17													30	−	−	−	..
Watervliet	Tap, Third avenue and 8th street, public supply	10/24/17													45	−	−	−	..
Watervliet	Tap, Third avenue and 13th street, public supply	10/24/17		2							5.00			10.40	65	−	−	−	..
Watervliet	Tap, Fifth avenue and 14th street, public supply	10/24/17													55	+	−	−	..
Watervliet	Tap, 8th avenue and 12th street, public supply	10/24/17													110	+	+	+	..
Watervliet	Tap, 15th street and Third avenue, public supply	10/24/17													250	+	−	−	..
Watervliet	Tap, Broadway and 17th street, public supply	10/24/17													190	+	−	−	..
Watervliet	Tap, Seventh avenue and 19th street, public supply	10/24/17		2							5.00			11.20	325	+	+	−	..
Watervliet	Hudson river water, chlorinated, public supply	10/24/17		3							7.50			20.40	55	−	−	−	..
Watervliet	Hudson river, at intake, public supply	10/24/17													10,500				..

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ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as—				Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present) (− = Absent)			
							Free ammonia	Albuminoid ammonia	Nitrites	Nitrates						10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Watervliet	Well, Sixth avenue, between 19th and 23d streets, public supply	11/ 1/17								40.00	90.00				650	+	+	−	..
Watervliet	Well, Fourth avenue, between 18th and 19th streets, public supply	11/ 1/17								.15	30.00				20	+	+	−	..
Watervliet	Well, 14th street and Fifth avenue, public supply	11/ 1/17								5.00	925.00				20	+	+	+	..
Watervliet	Well, No. 1320 Sixth ave., No. 13th st., public supply	11/ 1/17								20.00	36 00				140	+	+	−	..
Watervliet	Well, Seventh ave., between 11th and 12th streets, public supply	11/ 1/17								7.50	20.00				180	+	+	+	..
Watervliet	Well, Broadway, near 13th street, public supply	11/ 1/17								20.00	32.00				225	+	+	+	..
		11/ 1/17								5.00	32.00				25	+	−	−	..
Watervliet	Well, Ninth street and Broadway, near 1 irst avenue, public supply	11/ 1/17								5.00	32.00				25	+	−	−	..
Watervliet	Well, Second ave. and 6th street, public supply	11/ 1/17								4.00	38.00				45	+	−	−	..
Watervliet	Well, Fourth ave. and 7th street, public supply	11/ 1/17								5.00	52.00				60	−	−	−	..
Watervliet	Well, Seventh ave., between 7th and 8th streets, public supply	11/ 1/17								.05	16.00				30	+	−	−	..
Watervliet	Well, Fifth ave., between 6th and 7th st., public supply	11/ 1/17								.05	20.00				25	+	−	−	..
Watervliet	Well, Second ave., between 3d and 4th streets, public supply	11/ 1/17								7.00	18.00				25	+	+	+	..
Watervliet	Well, pump, southern part of Village street, public supply	11/ 1/17								2.50	22.00				40	−	−	−	..
Watervliet	Well, Fifth avenue between 1st and 2d streets, public supply	11/ 1/17								1.25	56.00				130	+	+	−	..
Watervliet	Raw Hudson river water, public supply	11/ 3/17													8,000			+	+
Watervliet	Hudson river water, chlorinated, public supply	11/ 3/17													75	+	−	−	..
Watervliet	Tap, No. 1621 Second avenue, public supply	11/ 3/17													75	+	−	−	..
Watervliet	Raw Hudson river water, public supply	11/ 5/17													99,000				+

Watervliet	Hudson river water, chlorinated, public supply	11/ 5/17															70	−	−	−	+	..
Watervliet	Raw Mohawk river water, public supply	11/ 5/17														8.40	2,600	+	+	−	+	..
Watervliet	Mohawk river water, chlorinated, public supply	11/ 5/17														8.40	40	−	−	−	−	..
Watervliet	Raw Hudson river water, public supply	11/ 8/17															3,400	+	+	+	+	..
Watervliet	Hudson river water, chlorinated, public supply	11/ 8/17														11.60	70	−	−	−	−	..
Watervliet	Raw Mohawk river water, public supply	11/ 8/17															16,000	+	+	+	+	..
Watervliet	Mohawk river water, chlorinated, public supply	11/ 8/17															2,700	+	+	+	+	..
Watervliet	Raw Hudson river water, public supply	11/11/17															12,000	+	+	+	−	..
Watervliet	Hudson river water, public supply	11/11/17															20	−	−	−	−	..
Watervliet	Normanskill, new supply, public supply	11/11/17														8.30	325	+	−	+	−	..
Watervliet	Raw Hudson river water, public supply	11/13/17															2,400				+	+
Watervliet	Hudson river water, chlorinated, public supply	11/13/17															20	+		−	−	..
Watervliet	Tap, City Hall, public supply	11/13/17															850	+		+	+	..
Watervliet	Raw Hudson river water, public supply	11/14/17															2,100				+	+
Watervliet	Hudson river water, chlorinated, public supply	11/14/17															25	−		−	−	..
Watervliet	Raw Mohawk river water, public supply	11/14/17															3,500	+		+	+	+
Watervliet	Mohawk river water, chlorinated, public supply	11/14/17															11,500	+		+	+	..
Watervliet	Raw Normanskill water, new supply, public supply	11/14/17															250	+		+	−	..
Watervliet	Tap, 19th street and Seventh avenue, public supply	11/14/17															35	−		−	−	..
Watervliet	Hudson river water, chlorinated, public supply	11/19/17															20	+		−	−	..
Watervliet	Raw Mohawk river water, public supply	11/19/17															6,400	+		+	−	..
Watervliet	Mohawk river water, chlorinated, public supply	11/19/17															25	−		−	−	..
Watervliet	Normanskill, chlorinated, new supply, public supply	11/19/17	50	70			.040	.134	.015	0.30	2.80	57.10	50.00	6.80	60	+		−	−	..
Watervliet	Raw Hudson river water, public supply	11/23/17															5,100					+
Watervliet	Hudson river water, chlorinated, public supply	11/23/17															10	−		−	−	..
Watervliet	Raw Mohawk river water, public supply	11/23/17															7,000	+		+	+	−
Watervliet	Mohawk river water, chlorinated, public supply	11/23/17															7,700	+		+	+	..
Watervliet	Raw Normanskill, new supply, public supply	11/23/17	35	40			.056	.154	.010	0.30	2.60	65.70	50.00	6.30	390	+		−	−	..
Watervliet	Normanskill, filtered, new supply, public supply	11/23/17	20	10			.032	.100	.010	0.30	2.80	65.70	41.00	4.90	35	+		−	−	..
Watervliet	Tap, Seventh avenue and 19th street, public supply	11/23/17															1,700	+		+	−	..
Watervliet	Tap, Third avenue and 8th street, public supply	11/23/17															260	+		+	−	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Concluded*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as—				Chlorine	Hardness total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ = Present, − = Absent)			
							Free ammonia	Albuminoid ammonia	Nitrites	Nitrates						10 c.c.	1 c.c.	1/10 c.c.	1-100 c.c.
Watervliet	Normanskill, raw water, new supply, public supply	11/23/17													450	+	−	−	..
Watervliet	Normanskill, hypochlorinated, new supply, public supply	11/23/17													400	+	+	−	..
Watervliet	Filter effluent, new supply, public supply	11/23/17													230	+	−	−	..
Watervliet	Tap, City Hall, public supply	11/23/17													400	+	+	−	..
Watervliet	Tap, public supply	12/ 7/17												6.40	850	+	−	−	..
Watervliet	Filter effluent after chlorination, public supply	12/ 7/17												7.20	60	−	−	−	..
Watervliet	Effluent from clear water, well														45	−	−	−	..
Watkins	Raw Seneca Lake water, near intake, public supply	6/13/17													2,850	+	+	−	..
Watkins	Tap in center of village, public supply	6/13/17					.006	.062		0.40	65.00	105.80	106.00	2.90	31,500	+	−	−	..
Watkins	Tap, treated water, pumping station, public supply														12,500	+	+	−	..
Wayland	Tap, public supply	9/13/17					.002	.048		1.60	5.00	151.40	147.00	0.30					
Wayland	Tap, pumping station, public supply	9/22/17													850	−	−	−	..
Wayland	Tap, center of village, public supply	9/22/17													5,300	−	−	−	..
Webb	Tap, public supply	3/15/17	2	Clear	45	36	.014	.036	Trace	Trace	1.00	24.70	20.00	1.20	80	−	−	−	..
Wells Bridge	Tap, public supply	8/28/17					.002	.016		0.02	1.25	27.30	23.00	0.50	110	+	+	−	..
Wellsville	Raw water, public supply	3/12/17													3,700	+	+	+	..
Wellsville	Filtered water, public supply	3/12/17	15	5			.070	.134	.003	0.70	4.75	24.70	22.00	2.00	325	+	−	+	..
Wellsville	Tap of filter No. 3, public supply	4/ 6/17	10	3			.032	.068	.002	Trace	3.50	31.20	18.00	2.20	450	+	+	+	..
Wellsville	Supply main at filter, public supply	4/ 6/17													45	+	−	−	..
Wellsville	Tap, new filter, public supply	4/ 6/17	15	12			.040	.082	.004	0.02	3.50	39.00	34.00	3.90	30	+	−	−	..
Wellsville	Tap, R. R. station, public supply	4/ 6/17													40	+	−	−	..
Wellsville	Raw water, public supply	7/12/17	15	3			.074	.108	.007	0.30	3.00	64.30	29.00	3.20	200	+	−	−	..
Wellsville	Filtered water, public supply	7/12/17					.004	.046		0.70	7.25	78.00	72.00	1.60	50	−	−	−	..
Westfield	Tap at Beldens, public supply	6/26/17													200	+	+	−	..
Westfield	Tap at Portage Inn, public supply	6/26/17													300	+	+	−	..
Westfield	Tap, Dr. Foster's office, public supply	6/26/17													150	+	+	−	..
Westfield	Tap, Dr. Foster's office, public supply	8/ 6/17					.002	.026		0.10	2.25	154.20	140.00	0.50	5	−	−	−	..
Westfield	Tap at Beldens, public supply	8/ 6/17													5	−	−	−	..
Wellsville	Tap at Portage Inn, public supply	8/ 6/17													10	−	−	−	..
West Haverstraw	Tap, New York State hospital for crippled and deformed children	3/19/17	10	clear			0.14	.058	Trace	Trace	2.75	70.00	12.50	1.60	130	+	−	−	..

West Haverstraw	Tap, New York State hospital for crippled and deformed children	10/ 3 17														4,000	+	+	+	
West Winfield	Tap, public supply	4/10/17	3	12			.007	.010	.001	0.30	1.75	32.50	32.00	1.00		15	+	+	+	
West Winfield	Tap, public supply	5/16/17		Trace			.008	.010	.001	0.60	2.25	180.00	178.00	0.80		600	+	+	+	
Wheatfield	City tap, Dold farm	3/22/17														700	+	+	+	
Whitehall	Raw Mettawee river water, public supply	11/ 9/17														600	+	+	+	
Whitehall	Tap at pumping station, public supply	11/ 9/17														20	+	+	+	
Whitehall	Tap, public supply	11/ 9/17	15	15			.016	.052		0.50	2.60	77.10	73.00	1.90		275	+	+	+	
White Plains	Drew supply, public supply	4/26/17	Clear	Trace			.006	.007	Trace	0.70	7.00	185.40	136.00	0.90		5	+	+	+	
White Plains	Deep wells, public supply	4/26/17	Clear	Trace			.007	.014	Trace	Trace	4.75	52.00	34.00	0.70		16	+	+	+	
White Plains	Shallow wells, public supply	4/26/17	Clear	Trace			.028	.010	Trace	0.30	4.25	88.60	82.00	0.30		130	+	+	+	
White Plains	Reservoir, public supply	4/26/17	7	4			.045	.156	Trace	Trace	7.00	20.80	10.00	4.00		60	+	+	+	
White Plains	Tap, public supply	4/26/17	Clear	Trace			.002	.045	Trace	0.40	6.00	140.00	103.00	0.60		50	+	+	+	
Williamson	intake, public supply	5/ 2/17														30	+	+	+	
Williamson	Treated water at station, public supply	5/ 2/17														5	+	+	+	
Williamson	Tap, public supply	5/ 2/17	Clear	Trace			.017	.046	Trace	0.30	9.75	95.70	89.00	1.00		5	+	+	+	
Williamson	Raw water at intake, public supply	9/19/17		3			.032	.092	Trace	0.40	9.25	122.80	108.00	1.50		100	+	+	+	
Williamson	Tap at plant, public supply	9/19/17					.004	.114	Trace	0.60	9.25	102.80	96.00	2.30		30	+	+	+	
Williamson	Tap at Health Officers office, public supply	9/19/17														1,300	+	+	+	

DIVISION OF CHILD HYGIENE

DIVISION OF CHILD HYGIENE

HERMANN M. BIGGS, M. D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR.— I have the honor to transmit herewith the Annual Report of the Division of Child Hygiene for the year 1917.

The exigencies following our entrance into the war during the past year have largely affected both the progress of the work in the Division and the activities for child welfare in the field. Early in the year the Director, Dr. Henry L. K. Shaw, received a commission as Major in the Medical Reserve Corps, U. S. A., and at once responded to his country's call. The temporary vacancy thus created was filled by the appointment of Dr. Edward Clark of Buffalo as Acting Director of the Division.

The year 1916 has been recorded in the annals of public health of this State as the year of the great epidemic of infantile paralysis. This epidemic was sudden in its onset, so unexpected, and left so many crippled victims requiring careful and long continued after-care, that public efforts were somewhat diverted from the regular channels for child welfare to meet this new issue. Unusual efforts for child welfare along these lines had been put forth in all communities during 1916 and a reaction in 1917 was to be expected. Then came the entrance of the United States into the great world war, just at a time when it was hoped that efforts for child welfare throughout the State would be renewed along such lines as had been established prior to the appearance of the epidemic. This was not the case however, for matters pertaining to the preliminary preparations for effective war service organization absorbed the larger part of public attention, time and means, and for this reason the regular advancement of child welfare work was again inhibited for a time.

Although somewhat handicapped in 1917, the Division of Child Hygiene has endeavored to carry out the purposes for which it was created, and a careful study of the work accomplished by its

field and office force during the past year will show that this has been of great benefit. The year 1918, however, bids fair to accomplish even greater results than were attained in any year since the establishment of the Division of Child Hygiene in the State. This will be due to the special efforts to be made by all agencies having to do with child hygiene, to conserve the interests of all children throughout the State.

Infant welfare campaign

It has been the constant aim of the Division to utilize the best means for reducing the infant mortality in the State through constructive educational work. As in former years, every effort was made to bring the matter of child life conservation prominently before the public. Through the media of the public press, addresses, lectures, practical demonstrations, baby health conferences, children's day sermons, exhibits and distribution of child welfare literature public interest was enlisted throughout the State. As a result new infant welfare centers were established and are now being maintained as a part of community health work. A comparison of the infant death rate in cities where infant welfare stations have been established and maintained year after year, with the infant death rate of cities where such stations have not been established or have been abandoned for one reason or another after a year's trial, shows that in the former the infant mortality rate is constantly diminishing, while in the latter it is just as constantly increasing. Taken in connection with the fact that one-half of the deaths of infants is due to preventable causes, this would seem to demand that all communities of 10,000 or over be urged to attain a fifty per cent saving in infant lives by the establishment of one or more infant welfare stations and the appointment and support of one or more visiting trained nurses.

Little Mothers Leagues were formed in many parts of the State for the practical education in health matters of young girls, upon whom devolves to a large extent the care of the infant and the children of pre-school age in the home, particularly after school hours and during the summer vacation. The "Little Mothers" League is a name given to classes consisting of girls twelve to

sixteen years of age, which have as their object the instruction of their members in all practical matters relating to the infant and the child of pre-school age. The instruction given these girls by a competent trained nurse is carried out in a practical way, by actual demonstration, by example and by free discussions. The girls put the knowledge thus gained into practical operation in their homes, and from everywhere come reports of the excellent service which these well-informed "Little Mothers" are rendering in their own homes under the supervision, at all times, of their parents.

County fairs

As the time approached for the holding of the annual county fairs throughout the State the Commissioner determined upon a campaign to aid the Federal authorities in the conservation of food in the State. The county fair at once suggested itself as a means through which several hundred thousand citizens in the State and through them many more thousands could be reached and taught in a practical manner the relative value of the various foodstuffs and their relation to health. The Acting Director of this Division was therefore delegated to visit county fairs and combine this work with his talks on Child Hygiene. One hundred and forty-six addresses were given by him in thirty-four different cities and towns, at fairs, schools, clubs, boards of trade, etc. During September and October many county fairs were visited, a food exhibit installed, and large quantities of literature relating thereto distributed. This work was pronounced a great success by those in attendance at the fairs. The average number of persons addressed at the fairs at Hornell, Cortland, Gouverneur, Ogdensburg, Cape Vincent, Palmyra, Ithaca and the Rochester Exposition was 3,000. The usual subject of address was "Food and its Relation to Health".

Infant welfare nurses

The work of the infant welfare nurses of the Division has been planned and carried on with a view to a reduction of the infant mortality rate, wherever it has been found possible to do so. To this end a preliminary survey of the local health conditions was

made, as a rule, by one of these nurses, and a Child Welfare Exhibit held in the community when the survey had been completed. The survey was undertaken with a view to ascertaining what special feature of child welfare work was most needed in the community. Whether, for example, the infant death rate in a particular community was high owing to a faulty system of birth registration, or whether it was due to a poor milk supply as a source of artificial food for infant consumption. The complexity of population was investigated, as to its racial composition, its degree of illiteracy, poverty and ignorance. The general status of the people as to housing conditions, insanitation and drainage was also inquired into, as a basis for arriving at a decision as to the section of the community where welfare work was most urgently needed. This acted as a stimulus to more child welfare work in the community, such as "Clean-up Week", support of a visiting trained nurse, establishment of an infant welfare station or a milk station, and the organization of "Little Mothers" leagues. In addition to this the nurses were instrumental in disseminating in the homes and through talks to mothers' clubs, etc., practical education along the lines of baby hygiene and prenatal care. They have also been very helpful in their talks to mothers on the sanitation of the home, the care and feeding of the baby, and in matters relating to domestic economy.

Literature

The demand for infant welfare literature of all kinds, published by the Department, has largely increased. Approximately 250,000 child welfare leaflets and pamphlets have been distributed. Literature of this kind coming into the hands of those who are likely to be interested in it, might in itself be regarded as an educational feature of much value, a sort of correspondence school for those who can not secure this education in any other way. Requests for literature were received not only from within the State, but from many other parts of the country. The Department has had many of its publications for public distribution, printed in Polish, Hungarian and Italian. The value of literature of this

class distributed among the foreign-born of these nationalities is unquestionably large. That these people are coming more and more to appreciate the educational advantage which is offered to them in this way is evidenced by the increasing demand that a larger variety of health literature be printed in their native tongue. The Division is constantly adding new literature to its stock.

The little baby leaflets issued by the Department are also increasing in demand. Their titles, which follow, indicate their subject matter:

Before the Baby comes.
The New-born Baby.
The Food of the Baby.
Avoid Infection.
Care of Milk in the Home.
From the Bottle to Table Food.
The Summer Care of Babies.

In addition to the above, more than one hundred thousand copies of the booklet entitled "Your Baby, How to Keep It Well", and much other literature in the form of bulletins, circular letters, etc., have been sent out during the year. During the first week of May a State Child Welfare Day was observed; this is a feature of child welfare work of annual occurrence. Letters were sent to clergymen, women's clubs, and other organizations, explaining the object of Child Welfare Day and urging their cooperation to make the day a success. The response was hearty and cordial and the results very satisfactory.

Motion pictures and slides

Lantern slide and motion picture exhibits, illustrating various phases of child welfare work were given at thirty-nine different places as follows: Altmar, Forestville, Johnstown, Brockport, Niagara Falls, Alfred, Wallkill, Whitehall, Lacona, Silver Creek, Sherman, Tyrone, Amsterdam, Millerton, Fredonia, Lima, Utica, Rome, Carthage, Glens Falls, Cohocton, Buffalo, Fultonville, Middleburg, Schenectady, Kingston, Delanson, Dolgeville, Sauquoit, Poland, Hermon, Poughkeepsie, Edwards, Port Washington, Warwick, Albany, Middle Granville, Brooklyn and Milton.

Lectures

Wherever practicable the lecture platform has been utilized to aid the spread of health information along the line of child hygiene.

The Director gave the following special addresses during the year.

"Relationship Between the State Department of Health and Rural Communities", before the Rural Studies Class, Cornell University.

Annual address before the Babies Clinics Association at Grand Rapids, Michigan.

"Milk and Morbidity", before the Health Officers of St. Lawrence and Jefferson counties.

Address to the graduating class of the "Little Mothers" leagues in Amsterdam.

An address on "Infant Welfare Work in New York State" was given at Lockport. Addresses were also given to the Rotary Club of Albany, St. Agnes School of Albany, Methodist Conference at Burnt Hills and the Rotary Club of Binghamton.

The Acting Director gave the following special addresses:

"The Necessity for a Tuberculosis Hospital in Washington County," delivered at the Community Club at Whitehall and before the Washington County Medical Society at Hudson Falls.

"Infant Mortality", an address given at the Women's Hospital Association at Batavia.

A number of addresses on "Food and Its Relation to Health" given in Schenectady and Amsterdam.

A talk before the Twentieth Century Club of Cincinnatus on "Child Hygiene," and another on "Food and its Relation to Health".

A lecture on "Adult Mortality" given before the faculty and advanced students of the State Normal School and Parent-Teachers Association at Fredonia.

Correspondence

In reply to inquiries regarding the work of this Division and relating to various matters pertaining to child welfare, approximately 2,000 letters were sent out. This correspondence covered

a wide range of subjects relating to child welfare, including advice on prenatal and after-care of the baby, the hygiene of infancy, baby feeding, the kind and amount of baby food, of exercise, of clothing; infant welfare stations, milk stations, the duties of a visiting trained nurse, educational work for child welfare, summer camps for babies, baby welfare exhibits, and milk pasteurization, etc.

Little mothers' leagues

The work of "Little Mothers" leagues has been continued. This organization aims to educate girls twelve to sixteen years of age in the practical management of the smaller children at home. The mother of a large family finds her time fully occupied with the many problems of the home, and outside help being unavailable owing to economic conditions in the home, the work of caring for the baby and children of pre-school age is given to the "Little Mother". The league teaches her how to care for the baby's feeding, clothing, eyes, ears, nose and mouth; what things are harmful to the baby; what things are helpful; under her mother's supervision she prepares the baby's bath, food and bed and looks to its general well being. The course of lessons, ten in number, is given along practical lines by a competent trained nurse. An examination is held at the end of the course and the members of each league are awarded a certificate of membership which has been duly signed by the Commissioner of Education and the Commissioner of Health. New leagues were established at Port Washington, Saranac Lake, Silver Creek, Wappingers Falls, Alfred, Herkimer, Hillburn, Locust Valley, and two at White Plains. The new leagues which have been organized during the year have a total membership of four hundred and eighty-six.

Infant welfare stations

During the year infant welfare stations have been established in Lackawanna, Dunkirk, Niagara Falls, Westbury and Medina. Seventy-one infant welfare stations were in operation in different cities and towns during the whole or part of the year. During the year reports have been received from the following stations: Dunkirk, Peekskill, White Plains, Tarrytown, Glen Cove, Herki-

mer, Lackawanna, Solvay, Elmira, Binghamton (2 stations), Albany (2 stations), Little Falls, North Tonawanda, Auburn, Batavia, Buffalo (13 stations), Olean, Poughkeepsie (2 stations), Schenectady (2 stations), Tonawanda, Watertown, Yonkers (4 stations), Jamestown (2 stations).

Recommendations

The close of each succeeding year brings home more forcibly the thought that after all the best way to reduce the infant death rate is by educational measures.

Public interest must be more fully aroused to the need of educating the thousands of young women who approach motherhood wholly unprepared to protect their own health, which is also the health of the coming child.

The public itself must be aroused to the dangers to the community which may lurk in an unpasteurized milk supply. Such milk may contain disease germs fatal to the infant, the child, the adult and the aged.

There is also need for a stricter supervision of the health and hygiene of the child of pre-school age. Much has been said and written concerning the welfare of the mother and the infant, but the public has received scant education with reference to the needs and training of the child of pre-school age. This the Division of Child hygiene hopes to remedy in the year 1918.

Respectfully submitted,

H. F. SENFTNER,
Acting Director

February 1, 1918

APPENDIX I

A brief survey of infant mortality rates for 1916

The following tables have been compiled from data supplied by the Vital Statistics Division. The first is a tabulation of those cities in which the prenatal causes of infant mortality predominated in 1916; the second, those especially affected by gastro-intestinal causes, and the third, those having a particularly high rate from respiratory causes. In studying Table I it is interesting to note that the proportion of the foreign-born in the population was (according to the 1910 census) below the average in every city, excepting Jamestown. The foreign element in Jamestown, however, is almost entirely Scandinavian, which may account for the exception.

MORTALITY OF INFANTS UNDER ONE MONTH OF AGE IN N. Y. STATE, 1916 (EXCEPTING N. Y. CITY)

	Per cen
General infant mortality rate under one month.....	48.9
General infant mortality rate under one month for native and British mothers.....	59.
General infant mortality rate under one month for Russia, Austria and Poland mothers.....	40

The three months showing highest rates

Infant mortality under one month: March (51.9) — April (50.3) — May (51.8).

The three months showing lowest rates

Infant mortality under one month: July (41.2) — August (41.4) — October (42.8).

	Deaths per 1000 births
Infant mortality under one month 1st quarter	49.1
Infant mortality under one month 2nd quarter	50.4
Infant mortality under one month 3rd quarter	42.2
Infant mortality under one month 4th quarter	46.6

PER CENT OF TOTAL OF DEATHS BY QUARTERS OF THE YEAR IN 1916

NATIVITY OF MOTHERS

	Native	British	Total foreign	Russia	Austria	Poland*
First quarter	24.9	28.4	23.9	22	26.3	24.3
Second quarter	23.4	26.1	23.5	24.9	22.5	23.7
Third quarter	27.5	27.6	32.3	34.2	32.3	33.8
Fourth quarter	24.2	17.9	20.3	18.8	18.5	18.2

* Includes Russian, Austrian and German Poland.

Infant Mortality in New York State in 1916 (Excepting New York City)

PER CENT OF DEATHS FROM PRINCIPAL CAUSES

Nativity of Mother

	Native	Total foreign, white	British	Italy	Russia	Austria	Poland*
Contagious diseases	4.1	5.6	4.5	7.1	4.8	5.0	6.4
Respiratory diseases	12.1	19.8	10.4	24.9	17.0	20.1	20.1
Gastrointestinal diseases	19.4	27.4	16.4	25.2	34.0	33.2	33.1
Prematurity, etc.	34.2	22.0	29.1	21.1	20.7	20.4	18.0
Malformation, etc.	17.9	13.0	21.6	10.8	12.7	12.2	11.6
All others	12.3	12.1	17.9	10.9	10.9	9.1	10.8

PER CENT FROM PARTICULAR CAUSES

Pneumonia	3.1	4.7	2.2	5.6	3.7	5.7	3.5
Bronchopneumonia	6.2	11.8	6.0	14.5	11.7	11.8	12.7
Diarrhea	17.5	26.3	14.9	24.1	32.6	31.5	31.2
Malformation	9.2	5.8	9.0	5.3	4.2	5.1	4.7
Premature births	25.4	16.1	26.1	15.7	13.8	14.5	13.0
Injuries at birth	5.3	5.0	10.4	4.1	6.1	4.3	5.4
Congenital debility	8.8	5.6	3.0	5.4	6.9	6.0	5.0

* Includes Russian, Austrian and German Poland.

NUMBER OF DEATHS PER 1000 BIRTHS FROM PRINCIPAL CAUSES

	Native mothers	Foreign mothers
Prematurity, etc.; malformations, etc	45.4	37.6
Gastro intestinal	16.9	30.1
Respiratory	10.5	21.7
Communicablediseases	3.5	6.2
Other	10.7	12.8

Table I

CITIES IN WHICH THE PRINCIPAL CAUSES OF INFANT MORTALITY WERE PREMATURITY, ETC., SHOWING THE NUMBER OF DEATHS PER 1000 BIRTHS IN EXCESS OF THE AVERAGE FOR ALL CITIES (EXCEPTING N. Y. CITY) 1916

CITY	Congenital debility and prematurity	Accident at birth, malformation, etc.	Difference in the per cent of the foreign born population in 1910, compared with the average for all cities
Elmira	7.0	.5	—9.8
Jamestown	9.9	3.5	*+10.0
Poughkeepsie	17.2	.....	—7.7
Watertown	16.2	13.4	— .5
Kingston	15.0	1.3	—10.7
Oswego	.....	17.4	— 5.6
Gloversville	5.9	5.7	— 4.4
Lockport	.4	6.6	— 5.9
Olean	4.3	.....	— 7.4
Ithaca	22.3	.....	—13.2
Hornell	3.3	1.4	—14.6
Ogdensburg	14.1	22.9	— 2.0
Batavia	8.9	10.9	— 5.5
Corning	16.1	7.5	—10.8
Rensselaer	9.4	8.9	—13.6
Fulton	12.9	1.1	— 6.9
Onconta	36.9	.....	—16.1
Ossining	.....	19.9	— .8
Beacon	20.2	.....	— 9.5
Plattsburg	49.0	.....	—14.0
Port Jervis	14.9	10.7	—11.9
Tonawanda	10.2	5.8	— 1.5
Salamanca	1.1	7.2	— 7.6
Norwich	14.5	.....	—14.7

* Nearly all Scandinavian.

Table II

CITIES IN WHICH THERE WAS AN EXCESSIVE DEATH RATE FROM GASTROINTESTINAL DISEASES — SHOWING THE NUMBER OF DEATHS PER 1000 BIRTHS IN EXCESS OF THE AVERAGE FOR ALL CITIES IN 1916

CITY	Gastro-intestinal diseases	Difference in the per cent of the foreign born population in 1910 compared with the average for all cities
Buffalo	8.4	+ 4.1
Yonkers	1.5	+ 9.4
Binghamton	17.3	*— 8.6
Niagara Falls	12.5	+15.7
Auburn	1.6	— 1.9
Cohoes	17.3	+ 5.9
Rome	4.2	— 3.9
Gloversville	11.8	— 4.4
Dunkirk	1.1	+ 5.9
Lackawanna†	40.0	+25.8
North Tonawanda	1.4	+ 6.4
Little Falls	8.7	+ 8.0
Hudson	21.3	— 4.6
Fulton	7.3	— 6.9
Port Jervis	5.4	—11.9
Salamanca	2.2	— 7.6

* There is much reason to believe that the foreign element has greatly increased in Binghamton since 1910. † Does not include nonresident deaths in the infant home.

Table III

CITIES IN WHICH THERE WERE EXCESSIVE DEATH RATES FROM COMMUNICABLE AND RESPIRATORY DISEASES SHOWING THE NUMBER OF DEATHS PER 1000 BIRTHS ABOVE THE AVERAGE FOR ALL CITIES IN 1916

CITY	Communicable disease	Respiratory
Buffalo	.....	3.5
Utica	.....	7.9
Troy	.....	8.3
Binghamton	8.9	.....
Niagara Falls	11.0	6.6
Amsterdam	4.1	.....
Cohoes	2.0	3.9
Rome	7.7	.....
Gloversville	.....	9.2
Dunkirk	2.4	.....
Glens Falls	.....	6.0
Lackawanna*	14.7	11.2
Watervliet	.....	25.9
Saratoga Springs	.....	33.5
Ogdensburg	3.9	.....
North Tonawanda	5.2	.....
Geneva	6.3	8.3
Cortland	2.4	.....
Hudson	.....	5.3
Rensselaer	13.5	7.6
Fulton	5.1	.....
Ossining	3.9	.....
Plattsburg	4.0	9.9
Oneida	4.5	.....

* Does not include nonr esident deaths in infant home.

At least three conclusions may be drawn from the above tables. First: That the greatest number of deaths among infants born of native mothers were due to prenatal causes, such as premature birth, congenital debility, congenital malformations, accidents at birth, atrophy, etc., while the diseases causing the greatest number of deaths among children of foreign mothers were from gastro-intestinal or respiratory causes. Second, that the particular nationalities mostly responsible for the high death rate from gastrointestinal diseases among the foreign-born portion of the population were the Russians, Austrians and Poles. These races were also principally responsible for the exceptionally high death rate from respiratory causes among the foreign element but were exceeded by the Italians with whom it nearly equaled the rate from gastrointestinal causes; and third, that there is need for a careful consideration of the following four factors which are so vitally important in connection with the control of infant mortality: (a) The lack of sufficient and proper education of expectant mothers in matters pertaining to their personal health and hygiene before the coming of the babe; (b) the necessity for a higher standard of midwifery practice; (c) the better care of the nursing mother and the new-born babe; (d) the imperative need of an improved milk supply for the artificially fed infant.

APPENDIX II

A Number of Child Welfare Reports for 1917, Received from Various Communities Throughout the State

The following annual reports on child welfare work have been received by this division. We regret very much that more reports of this kind are not available for the year 1917 owing to the ready response to our nation's call of so many health officers and trained nurses, in whose absence definite information as to child welfare work in their respective communities could not always be obtained.

Albany

INFANT WELFARE WORK IN 1917

Population — 112,551.

Infant welfare stations, two. One maintained during summer months only. Supported by voluntary contributions. Under auspices of Central Christian Mothers' Union and the Brady Maternity Hospital. Two visiting nurses.

Albany Guild (five nurses).

Day nurseries, three. St. Vincent's, corner of Green and South Ferry streets. Admissions: children of any age who need care particularly those of working mothers. The Deaconess, 100 Dallius street. Admissions: in case of illness or when both parents are working; children suspected of infection are sent home or to dispensary. Open Door Mission, 3 Columbia place; no report.

Infants' institutions, two. St. Margaret's House and Hospital; children admitted in case of illness or both parents working. Frances Elliott Austin Infants' Home.

YEARLY REPORT OF INFANT WELFARE STATIONS

Stations, two; time in operation (one, June 15 to December 31; the other, two months only).

	Broadway Station	South End Station
Total number of babies cared for during the year	149	306
Total number of breast-fed cases	101	64
Total umber of bottle-fed cases	48	26
Total number of mixed-feeding cases	....	10
Total number of nursing visits	1,109	1,735
Total number of mothers instructed, (many reinstructions)	83	....
Total number quarts of milk dispensed	13,140	1,015
Total number babies died connected with station	3	6
Total number Little Mothers' Leagues	2	1
Total number members in Little Mothers' League	83	15

Batavia

BIRTHS

American	225
Italian	108
Poles	22
Jews	4
Total	359

DEATHS

Premature and stillborn:	
Americans	19
Italians	14
Poles	2
Total	35
Under three months:	
Italians	6
American	3
Total	9
Over three months and under one year:	
American	9
Italian	1
Total	10
Over one and under two years of age:	
Italians	2
American	1
Total	3
Number of deaths under two years of age:	
American	32
Italian	23
Poles	2
Total	57

INFANT WELFARE STATION

Calls made:	
Well babies	1,715
Sick babies	219
Improved babies	170
Children over 2 years of age	159
Pregnant women	315
Other calls	375
Total	2,953
Calls, babies not registered	945

STATION ATTENDANCE

Mothers	518
Babies	408
Others	1,119
Total	2,045

Babies registered Jan. 1, 1917	91
Babies registered during year ending Dec. 31, 1917	69
Babies not registered, cared for during year ending Dec. 31, 1917	33
Total	193
Italians, registered	97
Americans, 53 registered and 31 not registered	84
Poles, 8 registered and 2 not registered	10
Deaths, 3 Americans, 2 Italians	5
Pregnant women instructed	51
Clinics	116
Total attendance at clinics	334
Number of quarts of milk dispensed	786
Families given relief	33

Baby contest May 10. Thirty babies entered.

Binghamton

ANNUAL REPORT OF THE CHILD WELFARE ASSOCIATION.

Officers: President, Mrs. W. B. Palmatier; Secretary, Mrs. G. N. Hall; Treasurer, Mrs. J. C. Updike.

Governing Board of nine Directors includes the Superintendent of Schools, Superintendent of Humane Society, Health Officer, President of Rotary Club and many others who are interested in the welfare of children. Number of members, 300.

Number of babies under care	212
Number of babies entered in Annual Better Baby Contest	152

One baby scored 100 per cent. and one 99 per cent.

Number of children brought to headquarters	608
Number of persons visiting headquarters	2,114
Number of physicians	95

Weekly clinics have been held since May 15 by one of our staff of six doctors, with 96 children in attendance.

Our work here has been under the supervision of a Registered Nurse since last February.

Mental Hygiene Clinics have been held weekly since May 7, conducted by the State Physician from the State Hospital in charge. Attendance, 220.

An August 1 a matron was placed at the Headquarters and a Babies' Clinic and Dispensary were opened in the Carroll Street School, a graduate nurse being there every morning and visiting in the homes in the afternoon.

Clinics are held on three days of the week, with a doctor in attendance to which 127 children have been brought.

We have been financed by the Rotary Club until May 14, when we became affiliated with the Broome County Humane Society and Relief Association, which is now our financial support, although we still have in other ways the hearty cooperation and interest of the Rotarians.

JAVA STREET WELFARE STATION

Jan. 1, 1917–Jan. 1, 1918.

Number carried over	110
Number new cases	231
Number entered normal	51
Number entered slightly ill	180
New breast-fed cases	111
New bottle-fed cases	60
New mixed feeding cases	67

Cases dropped:	
To home care	56
To hospitals	7
Over two years	45
To other agencies	2
Died:	
Under one year	13
Over one year	5
Number remaining under care	235
Number of clinics during month	150
Total attendance at clinics	1,169
Number babies examined	1,059
Number treatments	1,066
Prenatal record:	
Number of visits to home	74
Number of mothers instructed	70
Visits:	
Number of nursing visits	4,297
Number home cases given relief	14
Number of visitors during month	157
Milk dispensed:	
Number of quarts dispensed free	114
Number of quarts sold	0
Number of Little Mothers' Leagues	3
Total enrollment	79

Buffalo

Population — 475,781, U. S. census.
Population — 606,384, War Department.
Births — 13,486.
Infant deaths — 1,398.
Infant mortality rate — 103.66.

INFANT WELFARE WORK.

Day nurseries, four. College Creche, 77 Goodell street. Admissions: Children of the Charity Organization Society. Infant Jesus Day Nursery, 790 Filmore avenue. Admissions: Children from two to six years old (healthy ones only), whose mothers go out working. Mt. Carmel Guild, 1435 Broadway. Admissions: Children from nine months to six years; bottle-fed babies only, health and personal cleanliness of child previously ascertained of mother. Fitche Creche and Training School for Nursery Maids, 159 East Swan street. Admissions: Children of widows or deserted wives and mothers, ages from one month to six years; or a temporary privilege is sometimes granted if there is a father ill in hospital and the mother has to be the wage earner — but this only on close investigation of the district visitor; a charge of five cents per day, or ten cents for a family of children, every third child coming free — and in extreme cases free Creche privileges are granted. Mt. Carmel Nursery, 43 Miller avenue.

Public Health Nurses:
21 School nurses.
10 Communicable disease nurses.
35 District nurses of District Nursing Association.

Institutions devoted to the Welfare of Children:
1. Children's Aid Society.
2. Rosemary Smith Home.
3. Father Baker's Institution.
4. St. Mary's Infant Asylum.
5. German Catholic Orphan Asylum.
6. Buffalo Orphan Asylum.

7. Church Home.
8. Tuberculosis Pavilion for Children.
9. Crippled Children's Guild.
10. Protestant Home.
11. Prison Gate Mission.
12. Salvation Army Home.
13. St. Vincent's Female Orphan Asylum.
14. St. Agnes Training School.

Infant Welfare Stations 13:

Total number of babies carried over from 1916	1,523
Total number of new cases, 1917	2,366
Total number of babies cared for, 1917	3,889
Nursing visits	39,771
Total number of quarts of milk dispensed or sold	76,556

An annual Better Mothers' Contest is conducted in connection with Infant Welfare Work.

Cohoes

During 1917, owing to the impossibility of obtaining a physician to assume charge of the Dispensary, there was no attempt made to have a welfare station. The nurse employed from January to June 1, was sent out to do field work only, cooperating with the various physicians. In June the nurse resigned to accept a position with the Harmony Mills, a company employing 1,600 people. This nurse has been doing infant welfare work for the company. The work in 1918 will be revived April 1. A nurse has been engaged, and one — possibly two — welfare stations will be opened. This work to be done under the supervision of the Health Officer, the Local Committee for the Prevention of Tuberculosis of the State Charities Aid Association cooperating and defraying expenses.

Corning

REPORT OF INFANT WELFARE STATION

In May, 1917, the Social Service Society set aside part of its rooms for this use and clinics were held every week under the direction of Miss Hartranft, city nurse. The following physicians attended the clinic during the year: Doctors A. H. Rogers, H. B. Smith, W. S. Cobb, J. F. Dwyer, T. L. McNamara, W. A. Hanor, E. E. Whipple, H. A. Argue, F. H. Starr, M. C. Butler, A. M. Breed, osteopath, C. A. Carr, F. S. Swain.

At these clinics the babies were weighed and examined and instructions given in detail regarding their care, to the parents and guardians. Later they were visited in their homes for follow-up work by the city nurse, school nurse, Metropolitan nurse and Social Service Secretary. Two hundred and seventeen children under six years of age were brought to the Clinic and kept under observation, 1,250 visits were made to them by members of the Visiting Committee. No deaths occurred among these children.

Dunkirk

One Infant Welfare Station was opened in June, 1917, and abandoned in October on account of lack of results; women did not seem interested. It was maintained by the Board of Health. The public health nurse carried on the work.

Number of clinics, each week	1
Number of babies enrolled	10
Number of breast-fed babies	10
Number of mixed feeding cases	3
Number of nursing visits, mostly canvassing visits	401

No milk was dispensed or sold.
No Little Mothers' Leagues at the station.
No babies died during the period the station was maintained.

Glen Cove

INFANT WELFARE WORK, 1917.

Auspices of Village Improvement Association–District Nursing Committee.

Public Health Nurse — Edna Copeland, R. N., Tuberculosis, Orthopedic and Prenatal work, visiting nurses, infant welfare, Red Cross classes, etc.

Babies supervised	125
Mothers instructed	120
Home visits	850
Little Mothers' Leagues	4
Members enrolled	90

Infant Welfare Station (Italian Orchard Section).

Open from April to November. Weekly clinics. Physicians in charge, Dr. Joseph B. Connolly. Nurse, Edna Copeland, R. N.

Babies enrolled	43
Deaths	0
Breast-fed	20
Bottle-fed	6
Mixed-feeding	17
Milk dispensed	0

Baby contest — Prizes: Attendance, $5; highest improvement, $5; best baby, $5; second best, $2.50.

Glens Falls

CHILD WELFARE DEPARTMENT

It is a noteworthy fact that a review of the results of the activities of the Child Welfare Department of this city shows that education is everywhere coming to the front. The community in general has come to realize the necessity of such an institution. Young mothers welcome the opportunity to learn that health means much more than the mere absence of disease for their children and older mothers lament the fact that there was no such place to bring their babies "in their days."

One of the main features of the Child Welfare Work for the past year has been the selling of a high grade of milk, at a price varying from two to seven cents less than the regular price to consumers, to mothers having babies registered at the Station. The price paid per quart has been left to the judgment of the nurse after investigating home conditions. By this method milk has gone to homes where most needed. No milk is handled at the Station but a much larger territory is covered by selling the tickets and ordering the same to be delivered by the dairyman through a special arrangement agreed upon. In this way from April to December, inclusive, 3,296 quarts have been sold for infants, 394 quarts for the health class during the summer, and 3,024 for tuberculosis patients, making a total of 6,614 quarts with a cost to the city of approximately $250.

Following is a summary of statistics concerning the work of the nurse:

Activities carried on, months	12
Number of nurses employed	1
Old cases carried over from 1916	155
New cases	118
Cases died	8
Discharged for other reasons	29
Total number cared for	273
Total on record at end of year	236

Total number of babies brought to Station including revisits	489
Hours spent at Station by nurse	718
Adult visitors at Station	1,420
Visits made to sick babies by nurse	322
Visits made to well babies by nurse	549
Treatments and demonstrations given	161
Total number of calls made by nurse including Infant Welfare and General Public Health for entire year	2,041

Herkimer

REPORT ON INFANT WELFARE WORK DONE IN HERKIMER IN 1917 BY THE PUBLIC HEALTH NURSE

Nurse employed jointly by Board of Health and private organization to do general public health nursing.

Home visits were made all the year, and two stations opened for two months, viz., July and August. An epidemic of whooping cough seriously interfered with the attendance.

Population — 10,000.

Births (1913) 230, (1914) 238, (1915) 275, (1916) 306, (1917) 310.

Deaths (1913) 36, (1914) 24, (1915) 24, (1916) 40, (1917) 33.

Infant death rates (1913) 156, (1914) 100, (1915) 87, (1916) 130, (1917) 106.

Total number babies at milk station	23
Total number breast-fed cases	12
Total number bottle-fed cases	5
Total number mixed feeding cases	6
Total number mothers instructed	21
Milk dispensed or sold	0
Number of Little Mothers Leagues at station (7 meetings)	1

Home visits:

Prenatal	33
Nursing visits	145
Instructive visits	223

Hornell

VISITING NURSE'S REPORT FOR 1917

Children in need of special attention spent the month of August at the Children's Home instead of the usual place on Tobes Hill. Fred Wygant gave for the use of the children two large tents, so we had a real camp in the large backyard. The gain and expense was about as usual. The Tuberculosis Committee and Humane Society paid for the camp expenses beyond the regular monthly account at the home.

We now have four children at the Crippled Children's Guild in Buffalo having special treatments for deformities. These are all improving. Two more children are on the waiting list for entrance. One is to go as soon as arrangements are made. One little girl unable to speak was taken to a specialist at Sonyea, and following his advice, was taken to Rochester and placed in a special school. The reports from there are most encouraging.

Since the opening of the Children's Home I feel that much preventive work has been accomplished. We have 27 children living at the home and as many as ten more cared for during the day. Several of these children otherwise would be living in unhealthy surroundings. Last month 2,563 meals were served. One needs only to visit the Home at meal time to see what a healthy happy family it is. Much advice to parents, that other years has not been followed, has in many instances been followed, because "seeing is believing."

Hudson

Population — 11,554.
Births (1917), 335.
Deaths (infants up to five years) — 43.
(Note — A number of these deaths due to traumatism during labor, instrumental, etc.)
Stillbirths, 10.

INFANT WELFARE WORK

Owing to various causes the welfare station was discontinued. In its stead, the public health nurse established, by direction of the Health Officer, a card index of births was made and home visits to instruct the mothers in the care of the infants and to follow up the cases. This plan proved to be agreeable to the mothers and was productive of good results, until February, 1918, when the nurse was summoned to war work.
Total visits of nurse during year, 1,018.

Jamestown

INFANT WELFARE WORK

Infant welfare stations, 1. Maintained by the Visiting Nurse Association in cooperation with the local board of health. Visiting nurses from the association are in charge of the work. The welfare station is in the nature of a dispensary as well.
Public health nurses, 3.
Child Welfare Committee, Parent-Teachers' Association and Mothers' Clubs engaged in promoting child welfare.

Total number of babies cared for during year	159
Total number of cases carried over from 1916	141
Total number of breast-fed babies	122
Total number of bottle-fed babies	11
Total number of mixed-fed babies	26
Total number of babies connected with station	8
Total number of mothers instructed	159
Nursing visits	1,120

Lackawanna

Two Infant Welfare Stations are maintained by Lackawanna Social Center.
Free clinics are held weekly, one at 421 Wilkesbarre avenue, and one at 510 Second street.
The child specialist in charge is Dr. Frank Brundage of Buffalo.
The nurse is furnished and works under the supervision of the District Nursing Association of Buffalo.
Monthly reports on number of visits made. Numbers attending clinics, etc., are sent in to the State Department of Health through the Buffalo office of the District Nursing Association.
We have no milk station and shall probably not start one.
A visiting trained nurse works daily in cooperation and under the direction of any doctor in the city who desires her help.
Educational work for Child Welfare is done in the sixth, seventh and eighth grades of the public schools by the Child Welfare and District nurse. Talks on care and feeding the baby, also First Aid and bandaging are given.
A Baby Welfare Exhibit was held last May under the auspices of the State Board of Health in the rooms at 421 Wilkesbarre avenue.

Little Falls

INFANT WELFARE STATION

Number of cases carried over	181
Number of new cases	237
Number readmitted	1
Number entered normal	199
Number entered slightly ill	3
Number of new babies found	9
Number of breast-fed cases	206
Number of bottle-fed cases	38
Number mixed feeding cases	7
Cases dropped:	
To home care	74
To hospitals	1
Over 1½ years	49
Died:	
Under one year	21
Over one year	1
Total number of clinics	54
Total attendance at clinics	394
Number of babies examined	286
Number of treatments given	67
Prenatal record:	
Number of visits to homes	235
Number of mothers instructed	2,010
Visits:	
Total number of nursing visits	2,932
Total number of home cases given relief	18
Total number of visits during month	49

Mount Vernon

Population — 40,146.

Births — (1913) 852, (1914) 906, (1915) 938, (1916) 915, (1917) 927.

Number of infants' deaths — (1913) 85, (1914) 78, (1915) 78, (1916) 78, (1917) 82, (includes stillbirths).

Infant mortality rate — (1913) 100, (1914) 86, (1915) 83, (1916) 88, (1917) 88.

INFANT WELFARE WORK

Infant Welfare Stations, one. Maintained by Board of Health. Nurse, Visiting Nurse Association. Cooperations.

Board of Health Nurse.

Day nurseries, one. Day Nursery of the Associated Charities. Admissions: children clean and free from vermin; homes visited by Committee of Inspection before admission. Capacity, 50. Lectures and talks afforded mothers.

YEARLY REPORT OF INFANT WELFARE STATION

Stations, 1; time in operation, 3 months.

Total number of babies cared for during year	20
Total number nursing visits	20
Total number of mothers instructed	20
Total number quarts of milk dispensed or sold	113
Total number of babies died connected with station	0
Total number of Little Mothers' Leagues	0

Newark

INFANT WELFARE WORK

An organization known as the "Child's Welfare League" is in existence in Newark, N. Y.

Offices assumed, viz.: To care for destitute babies and small school children by furnishing, or causing to be furnished, necessary food, clothing and other necessary supplies for school purposes and occasionally medical services.

The Ladies Aid Society frequently cooperates with the above named society as regards clothing and medical services.

No regular trained visiting nurse is employed but the regular school nurse assumes in part such duties.

It is expected that there will be greater activity along this line during the present year.

Newburgh

Population — 27,878.

Births, 598; during 1916 there were recorded 544 births.

Birth rate in 1917, 21.4; during 1916, 19.1.

There were 80 deaths under one year; 31 of which were stillbirths. In 1916 there were 64 deaths; 16 of which were stillbirths. The infant death rate during the year was 82 per thousand. During 1916 the rate was 87 per thousand. In four years the infant death rate has been reduced from 147 per thousand to 82 per thousand.

INFANT WELFARE STATION

Number of cases carried over	438
Number of new cases	491
Number of breast-fed cases	760
Number of bottle-fed cases	128
Number of clinics	7
Total attendance at clinics	408
Number of babies examined	408
Number of nursing visits	450
Number of visitors	888

New Rochelle

The Baby Welfare Station has continued and increased its usefulness and has won to its aid an association of interested people that will augment and strengthen our work.

Public Health Nurse.

Baby Welfare visits	1,875
Babies treated in homes	113
Mothers instructed in feeding	104
Prenatal visits	163
Clinics at Welfare Station	93
Attendance	1,005
Visits to licensed boarding homes	163

Niagara Falls

CHILD WELFARE WORK

Child Welfare Stations	2
Child Welfare Nurses	2

Nurses devote their time to the education of mothers and instruction in the homes.

YEARLY REPORT OF CHILD WELFARE STATIONS

Number of clinics held during year	131
Total attendance at clinics	1,518
Number of babies cared for during year	304
Number new babies during year	164

Number of bottle and mixed feeding cases	46
Number of nursing visits during year	3,677
Number of prenatal visits	45
Number of visits to midwives	24
Number of quarts of milk dispensed or sold	10,959
Number of babies died connected with stations	8
Little Mothers Leagues	2
Number members enrolled in L. M. L.	40

North Tonawanda

Population — 14,099.
Births — (1917), 506.
Deaths — One year and under, 61.
Infant mortality rate — 122.

INFANT WELFARE WORK

Infant welfare stations, one. Under the auspices of Board of Health, assisted by the Infant Welfare Society. Board of Health pay nurse's salary. The nurse in charge of welfare station in city of Tonawanda — adjoining.

Stations, one; time in operation, three years, six months.

Total number of babies cared for during year	387
Total number of breast-fed cases	332
Total number of bottle-fed cases	30
Total number of mixed feeding cases	25
Total number of nursing visits	99
Total number of mothers instructed	2,066
Total number of quarts of milk dispensed or sold	0
Total number of babies died connected with station	10
Total number of Little Mothers Leagues	0

Peekskill

INFANT WELFARE WORK

Infant welfare station, one.
Under the auspices of the Associated Charities.
Public Health Nurse in charge.
Friendly visitors (Associated Charities).

Public Health Nurse	1
School Nurse	1
Infant Institutions	1
Day Nurseries	1
Number on roll, Day Nursery	47
Aggregate attendance	1,749
Months open	11
Average per month	159

YEARLY REPORT OF INFANT WELFARE STATION

Stations, one.
Time in operation, 12 months.

Total number of babies cared for during year	153
Total number of breast-fed cases	76
Total number of bottle-fed cases	37
Total number of mixed feeding cases	40
Total number of nursing visits	1,324
Total number of mothers instructed (reinstructions)	1,077
Total number of quarts of milk dispensed or sold	0
Total number of babies died connected with station	2
Number of Little Mothers Leagues conducted at station	0

Plattsburg

INFANT WELFARE ACTIVITIES, 1917

Owing to lack of funds the nurse's services were discontinued during January, February and March.

Welfare station re-opened April 1.

Total number of babies cared for during year	212
Total number of breast-fed cases	172
Total number of bottle-fed cases	40
Total number of nursing visits	1,188
Total number of mothers instructed	212
Total number of babies died connected with station	0

Bi-weekly clinics are held, child welfare literature distributed and talks to mothers given at the welfare station. In addition, we have conducted a health conference and a baby-contest in cooperation with the Woman's Home Companion and Clinton County Agricultural Society.

Potsdam

We have had no public demonstrations but the Ladies Aid, visited almost all the homes in the poorer districts, where small children live, giving clothes, food and good advice. Distribution of many leaflets. Given all personal attention possible, during the hot months to guard against poliomyelitis and dysentery.

Poughkeepsie

Population — 32,714.

Births — (1914) 801; (1915) 739; (1916) 784; (1917) 861.

Number of infants' deaths — (1914) 71; (1915) 75; (1916), 82; (1917) 90.

Infant mortality rate — (1914) 89; (1915) 101; (1916) 104; (1917) 104.

INFANT WELFARE WORK

Infant welfare stations, three. Supervised by a committee on child welfare under the direction of the Board of Health. The nurses in charge supply certified milk, distribute child welfare literature, maintain clinics and give talks to expectant mothers. Nurse at each station.

Three public health nurses. One tuberculosis nurse.

Day nurseries, one at Wheaton Park. Admissions: children from one month to six years of age whose fathers are in tuberculosis camp, or in jail. Capacity, 10 beds; average attendance, 14.

Infants' institutions, two. Home for Friendless. Admissions: Two to thirteen years. No report of other.

YEARLY REPORT OF INFANT WELFARE STATIONS

Stations, three; time in operation, Wheaton Park, 12 months; Eastman Park, 8 months; Winnikee Avenue, 4½ months.

Total number of babies cared for during year	616
Total number of breast-fed cases	501
Total number of bottle-fed cases	115
Total number of mixed-feeding cases	0
Total number of nursing visits	5,919
Total number of mothers instructed	3,968
Total number of quarts of milk dispensed or sold	7,922
Total number of babies died connected with station	20
Total number of Little Mothers' Leagues at station	1
Total number of members enrolled in L. M. L.	51

Stations, 3.
Wheaton Park, 12 months.
98 Church st., 7 months, transferred to Wheaton Park in October 15.
523½ Main St., 12 months.

Rochester

Population — (1917) 265,000.
Births — (1916) 6,812; (1917) 6,952.
Deaths — (1916) 586; (1917) 584.

INFANT WELFARE STATIONS

Infant welfare stations, 1916–1917, 12.
Public Health or Welfare Nurses, 17.
No Visiting Nurse Association.
Day Nurseries, 2; these are stationed at the Social Settlement and Industrial School. Children admitted, age 6 months to 8 years, 35c per day. A prenatal clinic is held at Baden Street Dispensary, also No. 14 school once a week.

Number of calls at home	10,613
Number of babies calling at station	2,180
Number of well babies	2,974
Number of sick babies	1,655
Number of breast-fed babies	1,974
Number of bottle-fed babies	289
Number of babies taken to Infants' Summer Hospital	44
Number of babies taken to other hospitals or dispensaries	188
Number of babies sent home from Infants' Summer Hospital	24
Number of babies who died	15
Number of prenatal calls made	247
Number of postnatal calls made	2,508
Number of children vaccinated against pertussis, completed	2,299
Number of children vaccinated against smallpox	3,688
Number of children who had Schick test	508
Number of children who had positive reaction	90
Number of children (3 injections) treated with toxin antitoxin	45
Number of children under 14 years of age	13,382
Number of children over 14 years of age	1,159
Number of families living in whole house	1,988
Number of families living in part house	3,144
Average salary per family per week	$12.50
Average rent per family per week	$3.00
Families where more than one is working	1,821

Rome

YEARLY REPORT OF INFANT WELFARE STATION, 1917

Stations, one; time in operation, July 1 to September 8, 1917.

Total number of babies cared for during the year	107
Total number of breast-fed cases	38
Total number of bottle-fed cases	25
Total number of mixed-feeding cases	44
Total number of nursing visits	37
Total number of mothers instructed	298
Total number of quarts of milk sold	0
Total number of babies died connected with station	0
Total number of Little Mothers' Leagues at station	3
Total number of members enrolled in L. M. L.	338

Roslyn

A Child Welfare Exhibit was shown in Roslyn last June, at which I am sorry to say there was a very slim attendance. Since that time clinics, attended by local physicians, have been held weekly. Many children have been brought to these clinics by their mothers, who have shown great interest and have followed instructions as to feeding and general care of their children. These clinics are still being held.

Rye

Infant welfare station, 1.
Trained visiting nurse, 1.
Station maintained by contributions from the wealthier residents of the village. Station has been very beneficial to the community.

Solvay

BOYD SCHOOL. NURSE, ANNA B. CHAFFEE. AUGUST 1-DECEMBER 1, 1917

	Babies under two years
Number carried over	0
Number new cases	170
Number re-admitted	0
Number entered normal	141
Number entered slightly ill	29
Number from other agencies	0
Number new breast-fed cases	83
Number new bottle-fed cases	70
Number new mixed-feeding cases	26
Cases dropped to home care	5
Cases dropped to hospitals	3
Cases dropped over two years	3
Cases dropped to other agencies	0
Died under one year	1
Died over one year	0
Number remaining under care	159
Number of clinics during month	74
Total attendance at clinics	314
Number of babies examined	238
Number of treatments given	73
Prenatal Record	
Number of visits to homes	24
Number of mothers instructed	30
Visits	
Number of nursing visits	631
Number of home cases given relief	10
Number of visitors during month	44
Milk Dispensed	
Number of quarts dispensed free	17
Number of quarts milk sold	20
Little Mothers' Leagues	
Number of Leagues	2
Total enrollment	60

PROSPECT SCHOOL. NURSE, AGNES V. HARVEY. JULY 1, 1917-JANUARY 1, 1918

	Babies under two years
Number carried over	0
Number new cases	121
Number re-admitted	0
Number entered normal	118
Number entered slightly ill	52
Number from other agencies	0
Number new breast-fed cases	16
Number new bottle-fed cases	79
Number new mixed-feeding cases	15
Cases dropped to home care	3
Cases dropped to hospitals	0
Cases dropped over two years	4
Cases dropped to other agencies	0
Died under one year	1
Died over one year	0
Number remaining under care	111
Number of clinics during month	33
Total attendance at clinics	134
Number of babies examined	130
Number of treatments given	54
Prenatal Record	
Number of visits to homes	593
Number of mothers instructed	227
Visits	
Number of nursing visits	991
Number of home cases given relief	13
Number of visitors during month	33
Milk Dispensed	
Number of quarts dispensed free	0
Number of quarts sold	15,173
Little Mothers' Leagues	
Number of leagues	1
Total enrollment	30

Baby exhibition held August 31, 100 babies present. This included babies from both stations.

Syracuse

Population — 158,514.

Births — (1913) 3,084; (1914) 3,358; (1915) 3,535; (1916) 3,863; (1917) 4,201.

Number of infants' deaths — (1913) 447; (1914) 419; (1915) 348; (1916) 382; (1917) 429.

Infant mortality rate — (1913) 145; (1914) 125; (1915) 98; (1916) 99; (1917) 102.

INFANT WELFARE WORK

There were no infant welfare stations carried on during the year 1917, owing to lack of appropriation. Nurses made house to house calls during the summer months, instructing mothers in the care of their babies, etc.

Visiting Nurse Association. Have charge of baby camp during summer, where children from day nursery are cared for and working mothers are afforded relief and rest.

Day nurseries, one. Syracuse Day Nursery. Admissions: Only children of working mothers, from 4 months to 7 years, inclusive. Physicians in daily

attendance; examine children and prescribe individual diets. Kindergarten playground with swings, sand heaps, etc.

Infants' institutions, seven. Baby Camp, Day Nursery, Free Dispensary, Onondaga Orphan Asylum, St. Vincent's Orphan Asylum, House of Providence, St. Mary's Maternity Hospital.

Tarrytown

We have one welfare station at Tarrytown, which was opened July 6, 1917. Local physicians alternate in service. The work was carried on in the Civic League rooms, by the Board of Health nurse for two months. The infantile epidemic the previous year made a marked difference, as the mothers were timid about bringing the babies out. But this year we expect to make great progress by having our own rooms and making it permanent the year round.

YEARLY REPORT OF INFANT WELFARE WORK

Total number of babies cared for	38
Total number of nursing visits	18
Total number of mothers instructed	38
Total number of quarts of milk given or bought	0
Total number of babies died connected with station	0

Utica

INFANT WELFARE WORK IN 1917

STATION RECORDS	Jay street	Varick street	Whites-boro	Total
New patients	316	115	119	426
Total enrollment	1,322	554	496	2,372
Active enrollment	316	251	257	818
Total visits to stations	29,399	18,357	7,989	55,743
Quarts of milk sold	40,167	20,635	6,619	67,421
Milk dispensed for charities	1,637	3,002	121	4,760
Maximum daily sale of milk	130	70	30	230
Clinic enrollment	226	152	257	635
New clinic cases	156	77	127	360
Total clinic visits	1,257	1,004	1,073	3,334
Number of visits to homes	3,741	3,352	5,556	12,649
Deaths among clinic cases	10	.....	2	12
Deaths among private cases	1	12	7	20
Total deaths	11	12	9	32

Prenatal Records	
Total, prenatal enrollments	575
Number of cases visited	211
New cases	173
Number of visits made	2,775
Births attended by physician	94
Births attended by midwife	25
Infant deaths	4
Maternal deaths	1
Infant Death Rate of City	
Total births	2,576
Total deaths under one year	291
Infant mortality rate of city	112

White Plains

Estimated population	22,465
Births	492
Number of infants' deaths	33
Infant mortality rate	67

INFANT WELFARE WORK

Infant welfare stations, one. Municipal support.

Public health nurse. Divides time between infant welfare and tuberculosis work.

White Plains District Nursing Association.

YEARLY REPORT OF INFANT WELFARE WORK

Stations, one; time in operation, July 2 to August 30, inclusive.

Total number babies cared for during period	61
Total number breast-fed cases	32
Total number bottle-fed cases	15
Total number mixed-feeding cases	14
Total number nursing visits	198
Total number mothers instructed	139
Total number quarts of milk dispensed	197
Total number "Little Mothers" Leagues	5
Total number members enrolled in "Little Mothers" Leagues	369

Yonkers

Population — 95,092.

Births — 2,488.

Number of infants' deaths — 200.

Infant mortality rate — 84.4.

INFANT WELFARE WORK

Infant welfare stations, four. Under supervision of Dr. Louis V. Waldron, Director of Division of Child Hygiene.

Little Mothers' Leagues, formed at public schools.

Organization doing child welfare work.

Public Health Nurses, one in charge of each welfare station.

Visiting Nurse Association.

Parochial School Nurse.

Day nurseries, two. Queens Daughters' Day Nursery and Prospect House. Admission: On physicians' permit stating that child is clean and free from contagion; age limit seven years. Each child's clothing, etc., kept separate.

Infant's institutions, six. Prospect House, Woman's Institute, Tuberculosis Auxiliary, Sunshine Society, Y. W. C. A., Board of Education.

YEARLY REPORT OF INFANT WELFARE STATIONS

Stations, four in number. Time in operation, 12 months.

Total number of babies cared for at stations during year	800
Total number of breast-fed cases	552
Total number of bottle-fed cases	162
Total number of mixed-feeding cases	86
Total number of nursing visits	13,833
Total number of mothers instructed	10,244
Total number of quarts of milk sold	67,640
Total number of babies died connected with stations	24
Total number of Little Mothers' Leagues	6
Total number of members enrolled in Little Mothers' Leagues	633

DIVISION OF PUBLIC HEALTH NURSING

DIVISION OF PUBLIC HEALTH NURSING

HERMANN M. BIGGS, M. D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR.— I have the honor to submit to you the following report of the Division of Public Health Nursing for the calendar year 1917.

Having been assigned on October 1, 1916, to the work of organizing the clinics for the after-care of infantile paralysis cases, I became the acting director of a staff of eight nurses trained in after-care work and of two muscle testers, experts in the application of the spring balance muscle test.

On January 1, 1917, the State was divided into eight districts for the after-care of the 3,302 survivors of the 1916 poliomyelitis epidemic, each district being put in charge of an "after-care" nurse.

The distribution of the cases in the various counties of the State at the beginning of the year is shown in the following table.

Table 1

STATISTICAL SUMMARY

COUNTY	1916 cases reported	Deaths	Reported recovered	Under orthopedic care	Refused to attend clinic	Removed or cannot trace	To be seen at future clinics	1916 cases seen	Some degree of paralysis	PARALYSIS OF ONE OR BOTH LEGS		Arm or arms totally paralyzed	Recovered	Abortive	Refused examination	Clinics held	Old cases examined	Not poliomyelitis	Operation advised, 1916 cases	Operation advised, old cases	Referred to institutions	APPARATUS FURNISHED	
										Cannot walk	Can walk											1916 cases	Old cases
Albany	42	6	2		1	1	11	21	19	3	12		1		1	1	16	3		3		1	2
Allegany	7	1					5	1	1	1												1	1
Broome	19	4					4	11	11	1	10					1	16	1		3		2	2
Cattaraugus	1						1																
Cayuga	32	16					9	13	13		11					1	8	4		5	1		
Chautauqua	13	3					10																
Chemung	10	5					3	2	2														1
Chenango	32	7					9	16	15	3	8		1			1	3			1		1	1
Columbia	71	11	18	2		1	8	31	30	1	22		1			1		1				4	
Cortland	33	7					19	*7	*7		*5				1	1	13	1		7		2	3
Delaware	46	11					24	11	11	1	9					1	2		1	1		2	1
Dutchess	226	64				17	63	82	78	10	56		3		1	4	6	3		2		11	
Erie	13	5					8																
Essex	4	1				1		2	2		2												
Franklin	2						2																
Fulton	*	2					2																
Genesee	5						5																
Greene	42	11				1	16	14	12	2	10		1		1	2	4	2		2		1	
Hamilton	2	1					1																
Herkimer	20	7					5	8	5	1	4				2	1	7	1		6			1
Jefferson	84	18					39	27	23	2	11		1	1	2	2	11	1		4		3	1
Lewis	21	4					11	6	7	3	2												
Madison	80	14	1		1		35	29	27	3	19		2			2	3	3		2	1	6	3
Monroe	14	3					11																1
Montgomery	40	14			1		10	15	12	3	8		3			7	7	2		4		2	1
Nassau	513	90	98	19		48	61	197								6	15	2	1	6	1	11	6
Suffolk	478	79	83	12		60	104	140	281	44	142	4	28	26	2	6	10	2		4	1	7	1
Niagara	7	3					4																
Oneida	97	17	9		4	3	25	39	38	6	25		1			2	12		1	5		5	1
Onondaga	383	105			9	1	137	131	130	26	86	1	1			3	16	4	3	8		15	1
Ontario	4	1					3																
Orange	198	45	19		5	20	33	76	68	16	33		3	5		4	11	6	1	3	1	8	1

Orleans	2	1					1																5	
Oswego	171	36					63	72	64	12	41		7	1		4	24	7	2	12				
Otsego	56	17					17	22	22	2	18					1	3	3		1	1			
Putnam	15	5				2	7	1	1		1													
Rensselaer	37	4	1		6		3	23	23	3	20					1	12	2		3	3	1	1	
Rockland	51	6				9	15	21	19	3	10			1	1	1	24	2		1		2	1	
St. Lawrence	101	17	6		3	4	34	37	31	5	20		2	4		4	24	5	1	7		4	7	
Saratoga	22	6					3	12	13	2	9					1						7		
Schenectady	18	2					3	13	12	2	11		1			1	28	7	1	13			3	
Schoharie	10	4					4	2	2	2												2		
Schuyler	1							1	1		1												1	
Seneca	4	2					2																5	
Steuben	32	9					9	14	14		11					2	35	2		16		5	4	
Sullivan	137	32	9			58	21	17	14	2	11			3		1	4	1		2		1	1	
Tioga	26	8					5	13	10	2	6				3	1	8	2		4		1		
Tompkins	89	15	8		1		23	42	35	9	18		6	1		1	12			3		2	1	
Ulster	162	42	9			32	27	52	48	9	20		3	1		2	6	2		2		3	2	
Warren	36	6				2	2	20	18	3	15		1		1	1	2	1				3		
Washington	14	7					5	2	2		2											1		
Wayne	18	3					9	6	6	1	2					1	14	4		4			1	
Westchester	657	127	19	162	7	22	143	177	163	23	111	1	12		2	9	27	2		16		7	3	
Wyoming	6						6																	
	4,200	898	282	195	38	282	1,078	1,427	1,289	201	808	6	66	43	19	72	371	76	10	149	9	126	52	

*Onset on Long Island.

The above table also indicates the physical condition of the patients following the epidemic of the summer before; whether visited at one of our clinics or under other competent orthopedic care; and whether an operation was thought necessary by the surgeons. It also indicates the number of old poliomyelitis cases brought to the clinics in the various counties of the State.

Table 2

WORK OF AFTER-CARE POLIOMYELITIS NURSES SHOWING MONTHLY AVERAGES FOR YEAR 1917

DISTRICT	Average number cases seen at clinic	Average number cases visited for adjustment of apparatus	Average number cases recovered	Average number office calls on physicians in recovered cases	Average number telephone calls from parents	Average letters from physicians in recovered cases	Average letters from parents	Average municipalities visited	Average time spent at clinics	Average time spent arranging for clinics	Average time spent attending conferences	Average number cases in the district
									Hours	*Days*	*Hours*	
FROM JANUARY TO JANUARY, TAKEN FROM MONTHLY REPORTS Nassau and Suffolk counties	124	14	5	13	4	3	6	43	15½	2	2½	361
FROM JANUARY TO AUGUST Delaware, Sullivan, Rockland, Orange and Ulster counties	55	6	15	7	2	4	4	21	5½	4	5	218
FROM AUGUST TO JANUARY, 1918 Delaware, Sullivan, Rockland, Orange, Ulster and Greene counties/	76	6	1	21	.....	12	17	27	4	15	4	222
FROM FEBRUARY 1 TO OCTOBER 1 Oswego, Onondaga, Chenango*, Madison* and Oneida counties	88	7	2	14	11	4	2	6	12	3	1	537
FROM OCTOBER 1 TO JANUARY 1, 1918 Oswego and Onondaga counties	53	3	1	2	3	2	1	7	5	.....	.....	357
FROM JANUARY 1 TO AUGUST 1, 1917 Jefferson, Lewis and St. Lawrence counties	51	7	2	14	7	10	6	14	25	.....	1	132
FROM AUGUST 1 TO JANUARY 1, 1918 (Not visited until August 1, Clinton and Franklin) Clinton, Franklin, Jefferson, St. Lawrence and Lewis counties	33	8	5	10	1	1	2	20	8⅓	1	2	167
FROM JANUARY 1, 1917 TO AUGUST 1, 1917 Albany, Fulton, Herkimer, Otsego, Rensselaer, Montgomery, Schenectady, Saratoga, Schoharie, Warren, Washington, Columbia†, and Greene†	75	8	2	15	5	7	5	17	14	.....	.....	261

FROM AUGUST 1 TO OCTOBER 1, 1917												
Hamilton, Herkimer, Albany, Oneida, Fulton, Montgomery, Schoharie, Schenectady, Rensselaer, Warren, Essex, Saratoga and Washington counties	81	8	.....	.....	5	21	26	19	.....	.....	.....	248
FROM JANUARY 1, 1917 TO AUGUST 1, 1917												
Westchester, Putnam and Dutchess‡ counties	71	2	.....	3	4	2	1	14	7½	2	5	70
FROM AUGUST 1 TO OCTOBER 1, 1917												
Columbia, Dutchess, Putnam and Westchester counties	118	8	1	5	3	2	1	23	.....	.....	.....	71
FROM OCTOBER 1, 1917 TO JANUARY 1, 1918§												
Hamilton, Herkimer, Albany, Oneida, Fulton, Montgomery, Schoharie, Schenectady, Rensselaer, Warren, Essex, Saratoga, Washington, Columbia, Dutchess, Putnam and Westchester counties	83	.....	.....	.....	.....	.....	.....	12	17¼	.....	.....	71
FROM AUGUST 1, 1917 TO DECEMBER 1, 1917												
Cortland, Madison, Chenango, Otsego, Broome, Tioga, Tompkins, Schuyler, Seneca, Chemung and Cayuga counties	48	4	6	8	4	3	5	14	.....	5	17	.....
FROM AUGUST 1, 1917 TO JANUARY 1, 1918												
Steuben, Allegany, Cattaraugus, Wyoming, Yates, Livingston, Niagara, Orleans, Monroe, Wayne, Ontario, Chautauqua, Erie and Genesee counties	43	1	4	11	3	2	10	14	.....	8	11	231
FROM JANUARY 1, 1917 TO APRIL 15, 1917												
Columbia, Dutchess and Greene counties	71	10	.....	10	1	1	1	11	11	4	10½	114
FROM FEBRUARY 1, 1917 TO APRIL 30, 1917												
Allegany, Broome, Cayuga, Cattaraugus, Chautauqua, Chemung, Cortland, Erie, Genesee, Livingston, Orleans, Schuyler, Seneca, Steuben, Tompkins, Wyoming, Yates, Niagara, Monroe and Ontario counties	84	8	.....	20	3	4	2	19	17	7	1	178

/ Greene county added during these months.
* To August 1.
† Columbia and Greene counties added from April 15 to August 1.
‡ Dutchess county from April 15 to August 1, 1917.
§ Miss McKechnie's report not in for December. On vacation part of December.

NOTE.— No monthly reports received from the following counties from May 1, 1917 to August 1, 1917: Tompkins, Schuyler, Seneca, Chemung, Cayuga, Steuben, Allegany, Cattaraugus, Wyoming, Yates, Livingston, Niagara, Orleans, Monroe, Ontario, Chautauqua, Erie and Genesee.

The preceding table indicates the average monthly activities of each of the after-care nurses. These activities may be summed up briefly as follows:

First.— Seeing cases at clinics in consultation with the orthopedic surgeon.

Second.—Visiting cases to assist the attending physicians in the adjustment of apparatus.

Third.— Discharging cases when no longer in need of treatment.

Fourth.— Calling on physicians to offer assistance of nurses.

Fifth.—Answering telephone calls in regard to such assistance.

Sixth.—Answering letters from physicians and parents regarding cases.

Seventh.—Visiting the various municipalities in the nurse's district to accomplish the above and to instruct parents in muscle training.

Eighth.— Securing of attendance at clinics of patients not already examined by the orthopedic surgeons.

Ninth.—Attending conferences with the orthopedic surgeons, attending physicians, parents, etc.

Tenth.— Rendering reports of activities to the State Department of Health.

The nurses having the largest number of cases were assisted by other after-care nurses, similarly trained, in the employ of private agencies, there being three such on Long Island, three in Westchester county, one in Dutchess county, and one in Onondaga county.

From April 15 to July 1 the work of after-care was carried on entirely by the field nurses in their districts, no clinics being held. They were assisted in their work by the two muscle testers, these latter by their experience in the clinics having become expert examiners and muscle trainers.

In the smaller districts, and in those where traveling facilities were good, all of the patients who had been seen at the clinics were visited several times by the nurses. In the larger districts, where traveling facilities were poor, the cases could not be visited so often.

Upon the inauguaration of the third series of clinics on October

1, 1917, one of the regular staff of the State supervising nurses was again assigned to the after-care clinical staff as executive nurse, having acted in this capacity since the inception of the clinics in the fall of 1916. This nurse remained with the clinics until she was called into military duty on February 1.

One of the after-care supervising nurses was taken from her district to act as chief examiner at the clinics, assisting the orthopedic surgeon. During her absence from her district her territory was covered by the nurse in charge of the adjoining district. Many of the patients (277) having serious deformities as a result of the effects of the disease, either during the 1916 or previous epidemics, required operative treatment. For these cases the nurses secured admission in either the State Hospital for Crippled and Deformed Children at West Haverstraw, or in the Hospital for Ruptured and Crippled at New York city, where they were operated on by the attending surgeons, after which their care was again supervised by the after-care nurses.

The gratifying results of this intensive system of follow-up by the supervising nurses in the after-care work is detailed in the report of Dr. L. W. Hubbard, the orthopedic surgeon, in charge of the work.

On April 1, in addition to the supervision of the nurses engaged in the "after-care" work, I was assigned as Acting Director of the Division of Public Health Nursing of the Department, thus taking over the direction of the work of the six state supervising nurses who have been engaged in public health nursing since the organization of the Division. The activities of these state supervising nurses are best shown by the following table:

Table 3

ACTIVITIES OF STATE SUPERVISING NURSES FROM JANUARY 1, 1917 TO APRIL 1, 1917

EPIDEMICS INVESTIGATED	Tuberculosis surveys	Child welfare exhibits and inspections	Midwives inspected	Addresses	Investigation of birth registration	Health surveys	Midwife prosecutions	Little mothers' leagues	Milk exhibits	Public health nursing survey
Catskill.....Typhoid	Greene county	Malone	Plattsburg	Stockton	Malone	Binghamton	Mineville	Mineville	Alfred	Lockport
Schenectady.....Typhoid		Morrisville	Utica	Alfred	Plattsburg	Tonawanda		Plattsburg		N. Tonawanda
Coxsackie.....Typhoid	Wayne county	Binghamton	Morrisville		Troy	N. Tonawanda				Tonawanda
Freehold.....Typhoid		Ithaca	Peterboro		Roslyn					Niagara Falls
Hillsdale.....Typhoid		Utica	Ramapo		Utica					Lackawanna
Chatham.....Typhoid		Fredonia	Haverstraw		Rensselaer					
Hudson.....Typhoid		Forestville	Clarkstown							
Tannersville.....Typhoid		Tonawanda	Nyack							
Jamestown.....Typhoid		Silver Creek	Piermont							
Lexington.....Typhoid		Smiths Mills	Spring Valley							
Binghamton.....Diphtheria			Cohoes							
Ravena.....Typhoid			Schenectady							
Selkirk.....Typhoid			Endicott							
Philmont.....Typhoid			Hubbardsville							
Claverack.....Typhoid			Oneida							
Rensselaer.....Typhoid			Buffalo							
Delmar.....Typhoid			Dunkirk							
Slingerlands.....Typhoid			Jamestown							
			Rome							
			New Hartford							
			Washington Mills							
			Celeron							
			Syracuse							
Total..... 18	2	10	23	2	6	3	1	2	1	5

Table 4

REPORT OF NURSES' ACTIVITIES FROM APRIL 1, 1917 TO JANUARY 1, 1918

EPIDEMICS INVESTIGATED	Tuberculosis surveys	Child welfare exhibits and inspections	Midwives inspected	Addresses	Investigation of birth registration	Health surveys	Rural obstetric investigation	Midwife prosecutions	Food exhibits
Albany.....Typhoid	Wayne county	Dunkirk L. M. L.	Depew	Saugerties	Rensselaer	Watervliet	Dutchess county	Niagara Falls (two)	Cortland
Binghamton.....Diphtheria	Greene county	Tonawanda	Niagara Falls	Melrose (Grange)	Utica	Troy			Binghamton
Syracuse.....Typhoid	Westchester county	Silver Creek	Buffalo	Red Cross (3)	New York Mills	New Hartford			Gouverneur
Watervliet.....Smallpox	Washington county	Sherman	Tonawanda	Albany (Mothers Club)	New Hartford	Whitestown			Lowville
Buffalo.....Typhoid	Livingston county	Poughkeepsie	Syracuse	Amsterdam (Mothers club)	Whitestown	New York Mills			Hornell
Lackawanna.....Typhoid		Mayville	Solvay	Fort Edward (Mothers club)	Albany	McConnelsville			Rochester
Tonawanda.....Typhoid		Lockport	Auburn	Schenectady (senior class for nurses at Ellis hospital)	Troy	Albany			Ogdensburg
Niagara Falls.....Typhoid		Lackawanna	Oswego	Canastota (French relief society)	Rome	Cohoes			Cape Vincent
Grand Island.....Typhoid		New York City	Fulton		Frankfort	Poughkeepsie			Owego
Watervliet.....Typhoid		Medina	Liverpool		Cohoes	Schenectady			Ithaca
Batavia.....Typhoid			Jonesville		Lackawanna				Cuba
Le Ray.....Typhoid			Fabius		Hoosick Falls				Elmira
Cohocton.....Measles			Pompey		Gloversville				Dundee
Atlanta.....Measles			Poughkeepsie		Poughkeepsie				Amsterdam
Wayland.....Measles			Port Chester		Watervliet				Boonville
Troy.....Typhoid			Beacon						Canajoharie
Brunswick.....Typhoid			Wappinger Falls						Palmyra
Lockport.....Typhoid			Binghamton						Dolgeville
Gasport.....Typhoid			Endicott						Schenectady
Middleport.....Typhoid			Peekskill						Little Falls
Newfane.....Typhoid			Lackawanna						Johnstown
Ridge Road.....Typhoid			Albany						Gloversville
Coeymans.....Typhoid			Watervliet						Fort Plain
Ravena.....Typhoid			Cohoes						Ilion
Poughkeepsie.....Dysentery			Utica						Herkimer
Cheektowaga.....Typhoid			Horicon						Utica
Valatie.....Dysentery			Chestertown						Canastota
Gowanda.....Smallpox			Newburgh						Rome
Schenectady.....Typhoid			New York Mills						
Colonie.....Typhoid			Frankfort						
Green Island.....Typhoid			Rome						
Albia.....Typhoid			Oneida						
Brockport.....Diphtheria			New Hartford						
Clyde.....Sore throat			Little Falls						
			Herkimer						
			Hoosick Falls						
			Camden						
			Hudson						
			Elmira						
			Big Flats						
			Horseheads						
			Newark Valley						
			Johnson City						
			West Albany						
Total..... 34	5	10	44	10	15	10	1	2	28
Added to preceding totals makes:									
Totals..... 52	7	20	67	12	21	13	1	3	28

1 Milk exhibit. Public health nursing surveys in 5 places. 2 Little Mothers Leagues.

The activities consist of:

1. *Prevention and control of tuberculosis.*

In the prosecution of this work, tuberculosis surveys have been made in five counties during the year, to discover the number of cases of the disease and to learn what provision existed for their care. Due to the enactment of legislation making it manatory for each county having a county tuberculosis hospital to employ a county nurse, five counties in which hospitals have been opened during the past year have recently employed county nurses and their work in their respective counties had to be organized.

In each county employing such county tuberculosis nurse, a state supervising nurse, trained in the field work of finding tuberculous cases and well acquainted with the procedure of securing proper diagnoses, the admission of patients to sanatoria, or home treatment of the same, has been sent to accompany the county nurse in her district and to acquaint her with the procedures necessary to secure such medical aid or material relief as was found necessary through existing municipal officers or social welfare agencies. A standard system of reports to be used by county tuberculosis nurses in rendering reports to the board of managers of county tuberculosis hospitals has also been devised. Thus the work of each county tuberculosis nurse has been standardized and her activities supervised by this Division.

2. *Prevention of infant mortality.*

The duties of the nurse assigned to this work consists of assisting local communities in inauguration of campaigns by means of surveys of local conditions, child welfare and milk exhibits, talks, demonstrations and distribution of literature on the subject of infant care. In cooperation with the Department of Education the nurse assigned to this work has endeavored to secure the formation of "health leagues" in the various schools throughout the State.

3. *The supervision of midwives.*

During the past year the supervision of midwives has been placed under the jurisdiction of the Division of Vital Statistics of the Department, and a state supervising nurse, having received special instruction in the supervision of midwives, has been assigned to the work. This nurse has obtained the licensing of

approximately 500 midwives practicing in the State, has secured the prosecution of women practicing without the necessary qualifications in three instances. She has also held classes for the instruction of midwives in the larger centers of the State in an effort to make these midwives efficient attendants on normal cases of childbirth, to reduce infant mortality and to improve birth registration. The supervision of midwives under the direction of the Vital Statistics Division, with the assistance of a full-time nurse, places the work upon a basis far more satisfactory than ever before.

4. *Investigation of birth registration.*

In selected communities where the records filed in the State Department show high infant mortality rates, investigations are conducted by the supervising nurses to learn if all the births occurring in such municipalities have been properly recorded. In many instances, by a house to house investigation many children are found whose births have never been recorded. On further investigation an unlicensed midwife is found practicing in the community, or one or more physicians are discovered violating the Vital Statistics Law requiring the prompt registration of a birth within five days of its occurrence. In this investigation the nurses have been assisted by access to baptismal records in the churches. Birth registration has been investigated during the past year in twenty-one different municipalities in the State, and in one county (Dutchess) an investigation was made to ascertain the development of obstetrical work in a typical rural community. This investigation brought out the need of better supervision of the mothers by the nurses in rural communities before, during, and after confinement.

5. *Health surveys.*

These surveys were made to determine the nature and amount of illness present in any given community and to learn what proportion of such illness was preventable. Such surveys were made in thirteen different municipalities in the State. Following these surveys measures were undertaken by the Department to bring the facts in each instance before the communities investigated and to formulate a plan whereby the toll from preventable illness might be lessened. In two of the largest second-class and in

several of the third-class cities of the State such an investigation has resulted in the reorganization of the local health department, and the employment of a full-time health officer with the necessary staff of assistants to carry out a well-defined health program suggested by our Department.

6. *Public health nursing surveys.*

On account of the entrance of this country into the war the demand for nurses in military service has been unprecedented. Four of the members of the nursing staff of the Department have already been called to service, the former director of the divisision, Miss C. Josephine Durkee, being now in charge of the Hospital Ste Eugenie, Laval, Rhone, France. The call of the nurses to the colors has severely crippled the nursing service which the Department has been able to render during the year.

Soon after war was declared the State Defense Council requested this Department to furnish a list of nurses engaged in public health or educational work in the State. By means of the public health nursing service already undertaken by the Division it was possible to furnish the Defense Council with the names of 542 nurses available for public health work. This list has been constantly drawn upon during the year, and the demand for such nurses ever exceeds the supply.

7. *Control of epidemics.*

In the investigation and control of epidemics two supervising nurses have been constantly employed assisting the epidemologists, sanitary supervisors and local health officers in locating the source of infection and in preventing further spread of the disease. This work has been accomplished in part through proper school teachers, municipal authorities and the public. The services of these two nurses were thus used in the investigation of 41 outbreaks of typhoid fever, 3 of diphtheria, 3 of measles, two each of smallpox and bacillary dysentery, and one of septic sore throat.

8. *Educational work.*

During the year many addresses have been made by the nurses on public health subjects before women's clubs and various groups of health workers, and a comprehensive campaign of public health education has been carried on by them throughout the entire State. There has been an ever increasing demand of the women of the State since the enfranchisement for public health lectures

before women's civic clubs. For this and other educational work one supervising nurse has given her full time during the year.

This nurse has recently been in charge of the Food Exhibits which has been shown at 28 county fairs besides numerous other municipalities. This exhibit consists of sample meals showing foods required in obtaining a well balanced ration, and showing the daily food requirement in calories of the normal individual. A lecturer in attendance at each exhibit explains the protein, carbohydrate and fat calorie content of various foods contained in the ordinary diet of the individual. By means of these exhibits practical food conservation, so essential to the winning of the war, is shown and at the same time the value of a well balanced diet in maintaining health and efficiency is equally well demonstrated. No other exhibit sent out by the Department has ever met with the sucess of this one, and everywhere it has been shown the Department is petitioned for a return date. In the rural districts the population was familiar with the feeding of balanced rations to their cattle and they are extremely interested in applying the same rule in feeding themselves, which makes the problem all the easier.

The next advance in educational work for the nurses I believe should be in the matter of education of the mothers of families as to the cause, extent and prevention of venereal diseases. With the formation of the Venereal Disease Bureau in this Department one of the essential methods of control of these diseases is by the education of the public in regard to the same. Nowhere is this education more needed than among the mothers of the State. Sex education should be taught at the mother's knee and not in the class room. To whom can we look to educate these mothers if not to the tactful, well-informed public health nurse? With the ravages of this disease among the civil population as shown by the draft, no greater need exists to-day than that of educating the boys and girls of the coming generation than information transmitted to their mothers previously by nurses trained to impart the same by public health experts.

Respectfully submitted,

JOHN A. SMITH,
Secretary

March 13, 1918.

DIVISION OF TUBERCULOSIS

DIVISION OF TUBERCULOSIS

HERMANN M. BIGGS, M.D., *Commissioner of Health, Albany, N. Y.*

DEAR SIR.— I have the honor to submit the following report of the Division of Tuberculosis for the year 1917:

The work of the department in relation to tuberculosis for the first six months of 1917 included the review and criticism of eleven different sets of plans submitted, as follows:

No. sets	County	Building	Remarks
1	Suffolk	Administration	Disapproved
3	Schenectady	Children's building	Submitted for criticism only
1	Schenectady	Children's building	Approved
1	Steuben	Hospital	Approved
3	Niagara	Hospital	Submitted for criticism
1	Rensselaer	Hospital	Approved
1	Montgomery	Extensions	Partially approved

The following sites were inspected by the Supervisor of Tuberculosis:

Ten in Rockland county.

Two in Columbia.

Four in Otsego.

The following addresses were delivered:

May 4	The Diagnosis of Tuberculosis in Children	Ithaca	Tompkins County Medical Society Tuberculosis Clinic
May 6	The Invisible Enemy	Albany	Baby Week Mass Meeting
May 11	County Tuberculosis Hospital Problems	Cincinnati	National Tuberculosis Conference

In addition to this work various meetings were attended, addresses delivered, special memoranda prepared and all work supervised in this office relating to notification and registration of tuberculosis cases. None of this was of sufficient magnitude to deserve special mention — most of it being a continuance of the work outlined in our 1916 report.

The following summary covers the work for the latter half of

the year, the writer having been made secretary of the department's committee on tuberculosis; this committee consisting of the secretary, director of the division of vital statistics, supervising inspector, architect and supervisor of tuberculosis.

This committee adopted at once a working scheme and put the same in force and held seven meetings in the balance of the year. They also adopted a state-wide program for the year 1918.

Inspections were made under its direction of county hospitals in course of construction in Rensselaer, Otsego, Steuben, Niagara and Chenango counties.

Numerous formal and informal conferences were held with committees of boards of supervisors at the Albany and New York offices of the department and in various counties for the purpose of expediting the work of site selection, appointment of architects, preparation of drawings and the awarding of contracts for county tuberculosis hospitals under the mandatory law.

Sites inspected as follows:

County	Number of Visits	Number of Sites	Number of Days Spent
Allegany	1	12	1
Clinton	1	5	1
Columbia	1	3	1
Delaware	2	8	2
Franklin	1	20	4
Genesee	1	21	1
Herkimer	2	1	2
Madison	2	5	2
Nassau	3	5	3
Rockland	3	1	3
St. Lawrence	2	9	3
Wayne	1	2	1
Westchester	3	1	3

Representatives of the engineering division assisted in these inspections, covering the items of water supply and drainage and sewerage.

The practice was inaugurated of requiring periodical census returns from county hospitals and obtaining like returns from

other institutions in the State treating tuberculosis. An inquiry was begun as to the vacancies in the tuberculosis hospitals and the matter of waiting lists.

An amendment to the Sanitary Code was prepared covering the matter of sneezing and coughing.

Much time was devoted to attempts to derive some practical advantage in the handling of tuberculosis from information obtained from draft records.

The Ulster County Hospital at Kingston was re-inspected.

Conferences were had with architects and sketches and drawings critically reviewed for Broome, Chautauqua, Delaware, Columbia, Herkimer, Livingston, Nassau, Otsego, Rockland and Westchester counties. Typical drawings of several types of sanatoria were prepared and numerous copies of these distributed to architects, supervisors and other interested persons.

The secretary of the committee made addresses before the Society of the Alumni of Bellevue Hospital, New York City, the New Jersey Conference on Tuberculosis and the Academy of Medicine of Northern New Jersey.

Respectfully yours,

E. S. McSweeny,
Supervisor

Feb. 17, 1918.

AFTER-CARE OF POLIOMYELITIS, 1917

AFTER-CARE OF POLIOMYELITIS, 1917

HERMANN M. BRIGGS, M. D., *Commissioner of Health, Albany, N. Y.*

DEAR SIR.— The task which the State undertook in order to restore to as nearly normal as possible those victims of the great poliomyelitis epidemic of 1916 who were unable to otherwise obtain adequate scientific treatment was begun October 17, 1916, under the oversight of Dr. Robert W. Lovett and two assistants.

Fifty-three clinics were held for the examination of patients and to give advice in regard to treatment. Between that date, October 17, 1916, and January 1, 1917, 1,539 cases were seen. Those portions of the State were covered where the outbreak started early in the summer, and the patients had completely recovered from the actue attack, and the normal restoration of muscle function had begun.

Four nurses who had had special training in Boston in after-care work, and who had also assisted in the clinics, were assigned to districts to follow up the treatment advised.

These districts were: (1) Long Island; (2) Westchester and Putnam counties; (3) Dutchess, Columbia and Green counties; (4) Rockland, Orange, Sullivan, Ulster and Delaware counties.

After January 1, 1917, the clinics were continued in the up-state districts until two complete series were finished, covering every part of the State where an outbreak of the disease had occurred. The second series ended June 20, 1917.

Between October 17, 1916, and June 20, 1917, 2,521 patients were examined, of these 1,694 belonged to the 1916 class of cases and 661 had the onset in previous years, and were classed as old cases. Six hundred and twenty-eight patients were re-examined at second clinics, the changed conditions noted on charts for the purpose, which were attached to the original charts, and copies sent to the field nurse and the physicians. The total number of clinics held in 1917 was 133.

Four additional nurses who had traveled with the clinic units and had become expert examiners and muscle trainers, were

engaged to carry out the follow-up work and placed in districts not previously covered.

The field nurse's duties consist in seeing the patients in their homes, and either carrying out the instructions given at the clinic personally or teaching the mothers to do so.

In the smaller districts and where the traveling facilities are good, or the nurse has had the use of an automobile it has been possible for her to make frequent visits, to do much of the treatment herself and to keep her patients under close supervision. In the larger districts and where the cases are scattered the visits have been less frequent, and more dependence has to be placed on the family.

In two large districts in the western part of the State the nurses became ill soon after they were assigned to their districts and the work naturally suffered somewhat in consequence.

It may be said in general that the best results have been obtained in those districts where the nurse was able to make frequents visits. During the first series of clinics comparatively little apparatus was ordered, especially for the 1916 cases as the plan advocated by Dr. Lovett of rest, massage, baths, etc., in the early months of convalescence was followed. Up to July 1, 178 pieces of apparatus consisting of short and long leg braces, arm splints, corsets, etc., were ordered from the Appliance Shop of the Children's Hospital at Boston, which furnished the appliances at cost prices. This apparatus was paid for in whole or part by parents, local social agencies, or was provided through the State Charities Aid Association, which had a special representative at the clinics.

This association has rendered most valuable aid in this and other ways, and it is quite certain that the work could not have been carried on so successfully without their assistance.

In addition to the apparatus ordered from the shop, the field nurses have made arm splints and corsets or had them made by local people under their direction and they have been very satisfactory.

More than 300 patients whose attack of poliomyelitis had occurred before 1916 were seen at the clinics. Many of these cases had had either inefficient treatment or none at all. As a result

many of them presented contractions and deformities which made them more or less hopeless cripples and required operations and hospital care for their correction. The problem of handling these cases was serious. The performance by the state surgeons of these necessary operations in local hospitals, leaving the after-care to others, presented serious difficulties and was not deemed advisable. The question was finally solved by referring operative cases either to the State Hospital for Crippled Children at West Haverstraw, to the Hospital for Ruptured and Crippled in New York City, in the service of Dr. Royal Whitman who was appointed a consulting orthopedic surgeon, or to local surgeons of known ability who had hospitals where they could supervise the after-care.

The results of these operations have been most gratifying. Many patients who had not walked for years are now able to walk with the aid of braces and crutches and are thus permitted to attend school or partially to earn a livelihood.

Other old and neglected cases, not so serious, have been made more comfortable by the application of proper braces and shoes.

A table of the operations performed and their results follows:

The correction of serious deformities either by means of operations or the application of plaster of paris splints and necessitating hospital care was advised for 376 patients at the clinics.

The number of patients who refused operation.....	104
The number of patients considering operations.....	16
The number of patients desiring operations and arrangements being made for same.....	29
The number of patients dropped or not found.....	13
	162

Of the remainder, namely, 214 patients:

Number corrected by apparatus without operation.....	17
Number operated on at Ruptured and Crippled Hospital, New York City.....	75
Number operated on at Boston.....	5
Number operated on in local hospitals.....	59
Number operated on at State Hospital or not reported on..	58
	214

Four patients died following the operations, three from complications of the operations and one from bronchopneumonia following scarlet fever and measles contracted after admission to the hospital.

The results have been excellent though it is still too soon to know the amount of permanent relief and restoration of function which will ultimately take place.

During July, August and September the work of the orthopedic surgeon who was appointed July 1, consisted principally in visiting the different districts to assist the field nurses, to examine and prescribe for patients who had never been to a clinic, to take measurements for apparatus or to modify and supplement clinic instructions. During these three months practically the whole State was covered, and more than 200 patients seen.

A special clinic was held in September at Hancock and twenty patients examined. On October 2, the third series of clinics was started at Watertown, the unit consisting of the orthopedic surgeon, an executive nurse, a chief examiner and two muscle testers who also acted as assistant examiners.

Up to January 1, 1918, forty-two clinics were held and all of the State except Long Island was covered.

Believing that sufficient time had elapsed to show definite results of treatment, it was decided that all patients who had been to one or more previous clinics should be carefully re-examined, the muscles regraded and comparisons made with the records on the original charts; the result to be stamped upon the new clinic chart. The classification adopted was as follows:

"Cured" when all the muscles were normal; "practically recovered" where functional power had been restored but where careful test showed that some of the muscles were not normal; "improved" or "greatly improved," based upon muscle tests, increased functional activity or statements of the parents that the child was stronger and could do more; "unimproved" or "worse," showing no change or less power.

A total of 466 cases were re-examined and of this number fifty-four were found to be cured or practically recovered, 318 improved and ninety-two unimproved, while two were distinctly worse that when first seen.

In those cases which were unimproved either the original paralysis was very extensive and severe or for various reasons the instructions given at the clinic had not been followed out.

The constant and regular supervision by the field nurses has prevented the occurrence of serious deformities and contractions, as they have been either forestalled or discovered so early that they were easily corrected by splints and other apparatus, thus preventing later serious and extensive operations.

Have the results so far justified the large epxenditure of public funds in carry on a work which has never before been undertaken by any State?

From a careful observation at the clinics I think it is safe to state that at least 75 per cent of the 1916 cases could not, for financial or geographical reasons, have received expert orthopedic advice and treatment, unless the State had brought it to them by means of the clinics.

Without such advice and treatment and the follow-up work of the field nurses, these cases would either have had no treatment or inefficient and harmful treatment, and the ultimate result would have been deformities or crippling which in many cases would have made the individual a burden to his family or a charge on the community.

Had it not been for the clinics many cases dating back several years, some of whom were apparently hopelessly deformed or crippled would never have been discovered. When the parents learned that there was hope of their children walking so that they could go to school many of them were eager to have the necessary operations performed and were willing to meet a portion of the expense for hospital care.

The task of properly treating and caring for such a large number of cases has proved greater than was expected when it was undertaken.

The work has been carried on under difficulties caused by bad conditions of travel in parts of the State during several months of the year, by the difficulty in obtaining and keeping trained field nurses owing to the demands of the war, by delays in providing apparatus due to the fact that the appliance shop in Boston was not equipped to turn out such a large quantity of

work rapidly; but in spite of these difficulties the results have been very satisfactory.

Credit should be given to the Westchester County After-Care committee which employed two nurses; the Nassau County Association, two nurses; the Suffolk County Health Association, one nurse.

These nurses together with many local nurses in various parts of the State have coöperated heartily with the department nurses and have contributed materially to the success of the undertaking.

Throughout the State this work of the State Department of Health has been commended in the public press and by organizations doing philanthropic and social work.

At the first and second series of clinics the attendance of physicians was large, and the instruction which they received will have its effect in the future.

One very notable clinic was held in Buffalo in May by Dr. Lovett and his assistants which lasted two and one-half days, 141 cases, mostly those of years previous to 1916, were seen and examined. The clinic was in the amphitheatre room of the Buffalo University, which was crowded with physicians and medical students.

A very considerable proportion of the cases which in the beginning were under the care of the physicians, have been turned over entirely to the nurses for care and supervision, demonstrating the confidence of the medical profession in the skill and devotion of these nurses. Many cases which inevitably drifted away into the hands of charlatans and irregular practitioners are now coming back to the care of the State since the promises of complete and speedy cures have not been fulfilled.

The same kind of work and supervision must go on, or what has been done in many cases will be rendered useless. Babies are now reaching the walking age and must be assisted; children who are wearing braces are growing, and the apparatus must be lengthened or modified in order to be efficient. The critical period is when improvement begins and the child is allowed, and perhaps encouraged, to overexercise the weakened muscles and nerve cells. The parents become discouraged unless there are frequent visits from the nurse, and an opportunity is given to

attend clinics and to learn the condition of the child by re-examinations and the comparison of records. The State Hospital, with its limited capacity, can not take care of all the patients needing treatment. Unless the home treatment is continued, many will lose what they have gained or grow worse.

The following are some of the more striking cases which illustrate what can be accomplished, if scientific methods are employed, with patients who have apparently become helpless cripples:

H. R., a girl in the northern part of the State, twelve years of age, was badly paralyzed several years ago. The father has some means and had tried to obtain help for his child but the State nurse found her walking about like a quadruped on hands and feet owing to very bad conditions at the hip joints. She was brought to one of the clinics and as a result of the advice then given was taken to the Hospital for Ruptured and Crippled in New York and had several operations performed. As a result she is now walking upright with the aid of braces and crutches and is cheerful and happy.

H. W. —This boy was paralyzed soon after he learned to walk and had been going about on his buttocks ever since. He had never been to school but since his operations he walks with the aid of braces and crutches, is able to go to school and the teacher reports that he is unusually bright.

P. R., a young woman who had not walked for five years. She left the hospital walking with the aid of braces and crutches and was so much improved in general health that about two weeks after her discharge, she was married.

E. C.— This girl had a very bad scoliosis (lateral curvature of the spine) as a result of infantile paralysis. As a result of a series of plaster jackets applied to correct the deformity her spine is now nearly straight. She has gained eight pounds in weight, and her general health has greatly improved.

Condensed summary

Cases reported, 1916			4,200	
Deaths reported			898	
Living 1916 cases				3,302
Reported recovered	282			
Under orthopedic care	195			
Refused to attend clinics	38			
Removed or cannot trace	282			
To be seen at future clinics	1,078			
	1,875			
Attended first clinics	1,427			3,302
1916 cases seen at first clinics			1,427	
Some degree of paralysis		1,289		
Legs paralyzed — cannot walk	201			
Legs paralyzed — can walk	808			
Arms paralyzed (1 or both totally)	6			
Other paralysis (abdominal, facial, etc.)	274	1,289		
Recovered		78		
Abortive		43		
Refused examination		17	1,427	
Old cases seen at clinics			351	
Other cases seen at clinics — not polio			76	
Total cases seen at clinics			1,854	
Total number clinics held			72	

Operations advised — old cases, 149.
Operations advised — 1916 cases, 11.
Apparatus furnished — old cases, 52.
Apparatus furnished — 1916 cases, 126.

Respectfully yours

LEROY W. HUBBARD
Orthopedic Surgeon

March 13, 1918

REPORT OF COMMITTEE ON VENEREAL DISEASE

REPORT OF THE COMMITTEE ON VENEREAL DISEASE

HERMANN M. BIGGS, M.D., *Commissioner of Health, Albany, N. Y.*

DEAR SIR.— I have the honor to submit the following as the report of the Committee on Venereal Diseases for the year 1917.

The Committee on Venereal Diseases was appointed in August, 1917, and consisted of five members from the departmental staff and two members representing the American Social Hygiene Association and the New York Social Hygiene Society. Since its organization five meetings of the committee have been held, the average attendance being 5.6.

At the first meeting of the committee, it was decided that the subject of the control of venereal diseases must be brought to the attention of the physicians of the State and their active cooperation secured. With this object in view eighteen medical societies with a membership of about 1,400, have been addressed by the various members of the committee. In addition to meetings of medical societies the subject has been the chief topic also for discussion at several health officers' conferences. The subject has also been presented to several lay organizations in the State, notably the 18th annual conference of Charities and Corrections. Eleven medical societies in addition to those enumerated above have extended invitations to the department for addresses on the subject of venereal disease control.

The local authorities in several municipalities have been aroused to the necessity for this work and plans for active educational campaigns are under way in these communities.

The committee has in preparation, lecture material in the form of slides and pamphlets, which will shortly be available.

It was decided by the committee that the control of venereal diseases could best be accomplished by the establishment of a

Bureau of Venereal Diseases and the following was adopted as the program for such a bureau:

1 Increased laboratory facilities for diagnosis.

2 Increased facilities for treatment of venereal diseases.

3 Salvarsan or its substitutes furnished through the bureau to those unable to pay for it.

4 Public instruction in venereal diseases.

5 Technical instruction of physicians in modern diagnosis and treatment of venereal diseases.

6 Advisory bureau — to which citizens of the State may apply in writing or in person for advice relative to sex hygiene and the treatment of venereal diseases.

7 State institutions — All persons admitted to State institutions of any kind, and also to county and municipal institutions to be examined for venereal diseases, and those found to be infected placed under treatment and kept under observation until the disease is no longer in an infectious stage.

8 Social service—An effective system of social service must be provided to insure the continued attendance and thorough treatment of infected persons.

Respectfully yours,

EDWARD H. MARSH,

Secretary, Committee on Venereal Disease

March 15, 1918

DIVISION OF VITAL STATISTICS

DIVISION OF VITAL STATISTICS

ALBANY, N. Y., *March* 5, 1918

HERMANN M. BIGGS, M. D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR.— I have the honor to submit herewith the annual report of the Division of Vital Statistics covering the results of registration of births, deaths and marriages in the State of New York during the calendar year 1917.

Very truly yours,

OTTO R. EICHEL,

Director

REVIEW OF VITAL STATISTICS FOR 1917

BY

GLADDEN W. BAKER,
Senior Statistician

Births

There were 246,453 births registered in New York State during 1917, equivalent to 23.5 per thousand total population of both sexes and all ages,—a rate slightly higher than in 1916 (23.4), but lower by 0.5 per thousand than the rate for 1915 (24.0). The movement of the birth rate in the State since the establishment of registration is shown below by five year periods, during the earlier of which incomplete registration resulted in deficient rates.

	Average annual birth rate
1885–1889	16.5
1890–1894	20.6
1895–1899	20.6
1900–1904	19.7
1905–1909	22.3
1910–1914	23.7
1915	24.0
1916	23.4
1917	23.5

Birth rate by districts. Table 12 pages 413, 415, shows the birth rate in the chief subdivisions of the State and in each city for 1917 and the five years' period 1912–1916.

Sex proportions at birth. Births of males in 1917 totaled 126,866 and those of females 119,587, the proportion of male to female births thus being 1,061 to 1,000. The corresponding proportions in each year, and by groups of years, from 1908 onward has been as follows in the State:

	Male births per 1,000 female births
1908–1917	1,055
1908–1912	1,058
1913–1917	1,051
1908	1,070
1909	1,062
1910	1,050
1911	1,053
1912	1,057
1913	1,052
1914	1,043
1915	1,052
1916	1,047
1917	1,061

The ratio is seen to have declined from 1,058 in the period 1908–1912 to 1,051 in 1913–1917. The proportion in 1917 (1,061 to 1,000) is the highest since 1909.

Births by months. The average daily number of births for each month stated in proportion to the average daily number for the whole year taken as 100 has been as follows during the decade 1908–1917:

The year	100
January	100
February	102
March	103
April	99
May	95
June	100
July	102
August	102
September	101
October	97
November	96
December	101

In February and March the proportion of births is high; a second high point occurs in July and August.

Birth rate by months. During the 5 years 1913–1917, the annual birth rate per 1,000 population at all ages has been highest in March and lowest in November.

BIRTH RATE BY MONTHS: NEW YORK STATE, NEW YORK CITY, AND STATE OUTSIDE NEW YORK CITY

MONTH	New York State 1913–1917	New York City 1913–1917	Rest of State 1913–1917
January	23.8	26.1	21.3
February	24.3	26.0	22.4
March	24.9	26.7	22.8
April	23.9	25.6	22.0
May	22.9	24.3	21.3
June	23.7	25.5	21.7
July	23.9	25.2	22.4
August	24.5	26.3	22.5
September	23.9	25.3	22.4
October	23.3	25.5	20.8
November	22.4	24.1	20.6
December	23.2	25.5	20.6

Stillbirths. Stillbirths are classed separately from births and deaths. The ratio of stillbirths to live births in the State has decreased during recent years.

	Stillbirths per 100 live births
1908–1917	4.5
1908–1912	4.8
1913–1917	4.3
1908	5.1
1909	5.0
1910	4.7
1911	4.7
1912	4.5
1913	4.6
1914	4.5
1915	4.3
1916	4.2
1917	4.0

The ratio of stillbirths to live births is lowest in the summer months:

	STILLBIRTHS PER 100 LIVE BIRTHS		
	1908–1917	1913–1917	1908–1912
The year	4.5	4.3	4.8
January	4.8	4.4	5.4
February	4.7	4.6	4.9
March	4.7	4.5	5.0
April	4.6	4.3	4.9
May	4.8	4.5	5.1
June	4.6	4.3	4.8
July	4.2	4.1	4.4
August	4.2	4.0	4.5
September	4.2	4.1	4.4
October	4.4	4.2	4.8
November	4.6	4.5	4.7
December	4.5	4.5	4.5

As compared with live births, the greater concentration of stillbirths in the winter may be further shown by stating the average daily number for each month in proportion to the average daily number for the year, taken as 100:

	1908–1917	
	Births	Stillbirths
The year	100	100
January	100	107
February	102	106
March	103	108
April	99	101
May	95	101
June	100	101
July	102	95
August	102	95
September	101	94
October	97	96
November	96	97
December	101	100

Deaths

The total number of deaths registered in New York State during 1917 was 154,127, corresponding to a rate of 14.7 per 1,000 total population at all ages. With the exception of the year 1915, when the crude death rate was 14.5, the rate of 14.7 is as low as any recorded for the State, identical rates being returned in 1916 and 1914. The movement of the death rate in the State since 1885 is shown below by five year periods; excluding the period 1885–1889, during which incomplete registration resulted in a deficient rate, there has been continuous decline.

	Average annual death rate
1885–1889	17.5
1890–1894	20.5
1895–1899	17.9
1900–1904	17.2
1905–1909	16.4
1910–1914	15.2

Death rate in New York City and rest of State. For the years 1915, 1916, and 1917 the death rates per 1,000 total population in New York city and the rest of the State have been:

	New York City	Rest of State
1915	13.9	15.2
1916	13.9	15.7
1917	13.7	15.9

These are crude rates, relating all deaths to total population. Inasmuch as the populations in these two areas differ in their age, sex, and racial composition, crude death rates, taking no account of these important factors in mortality, do not necessarily represent the comparative healthfulness of the two areas.

The following table shows the movement of the crude death rate in these areas since 1898.

	New York City	Rest of State
1898–1902	19.7	15.1
1903–1907	18.2	15.6
1908–1912	15.5	15.7
1913–1917	13.9	15.6

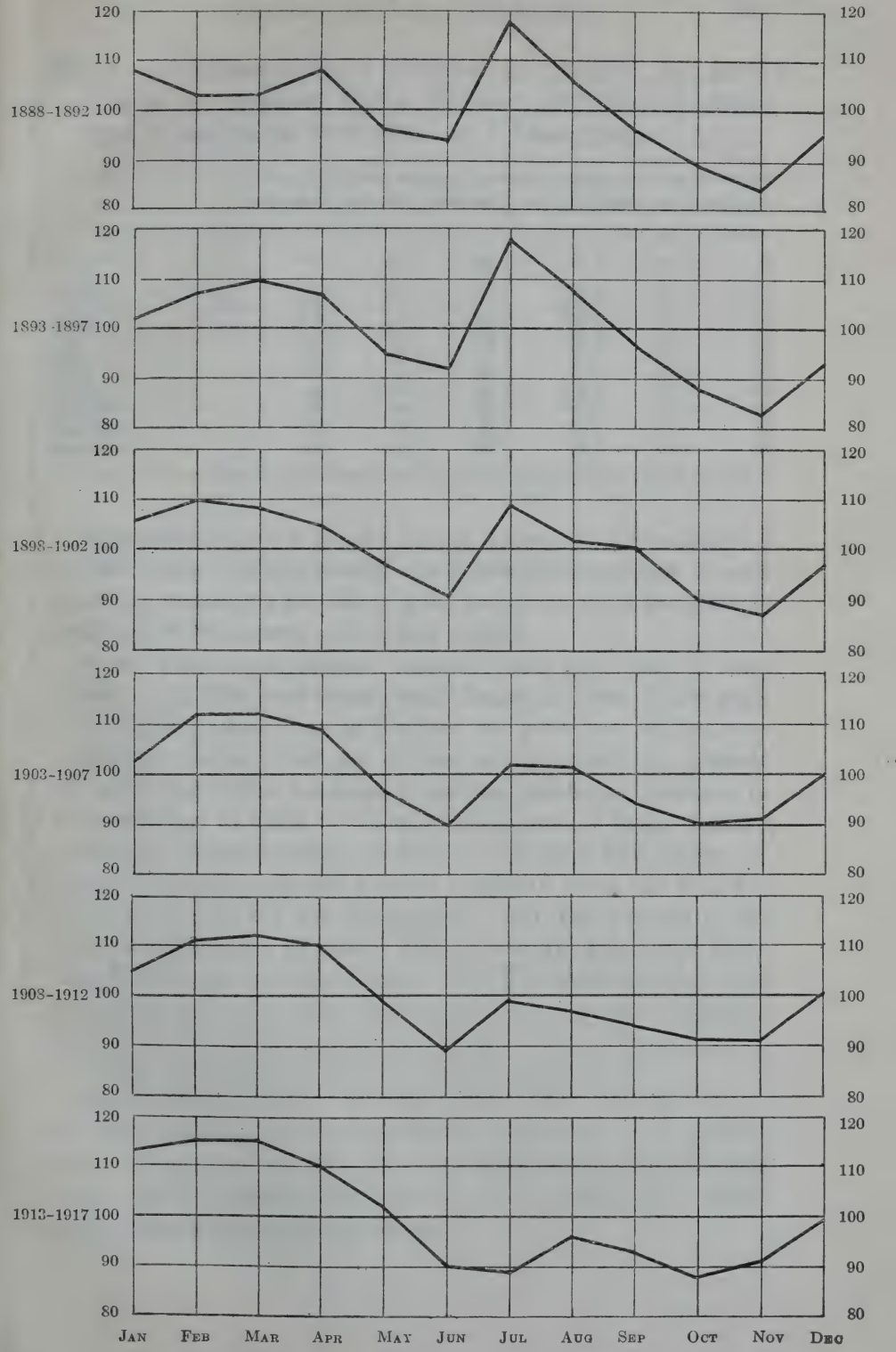
Death rate by districts. Table 12, pages 413, 415, shows the death rate in the chief subdivisions of the State and in each city for 1917 and the five years' period 1912–1916.

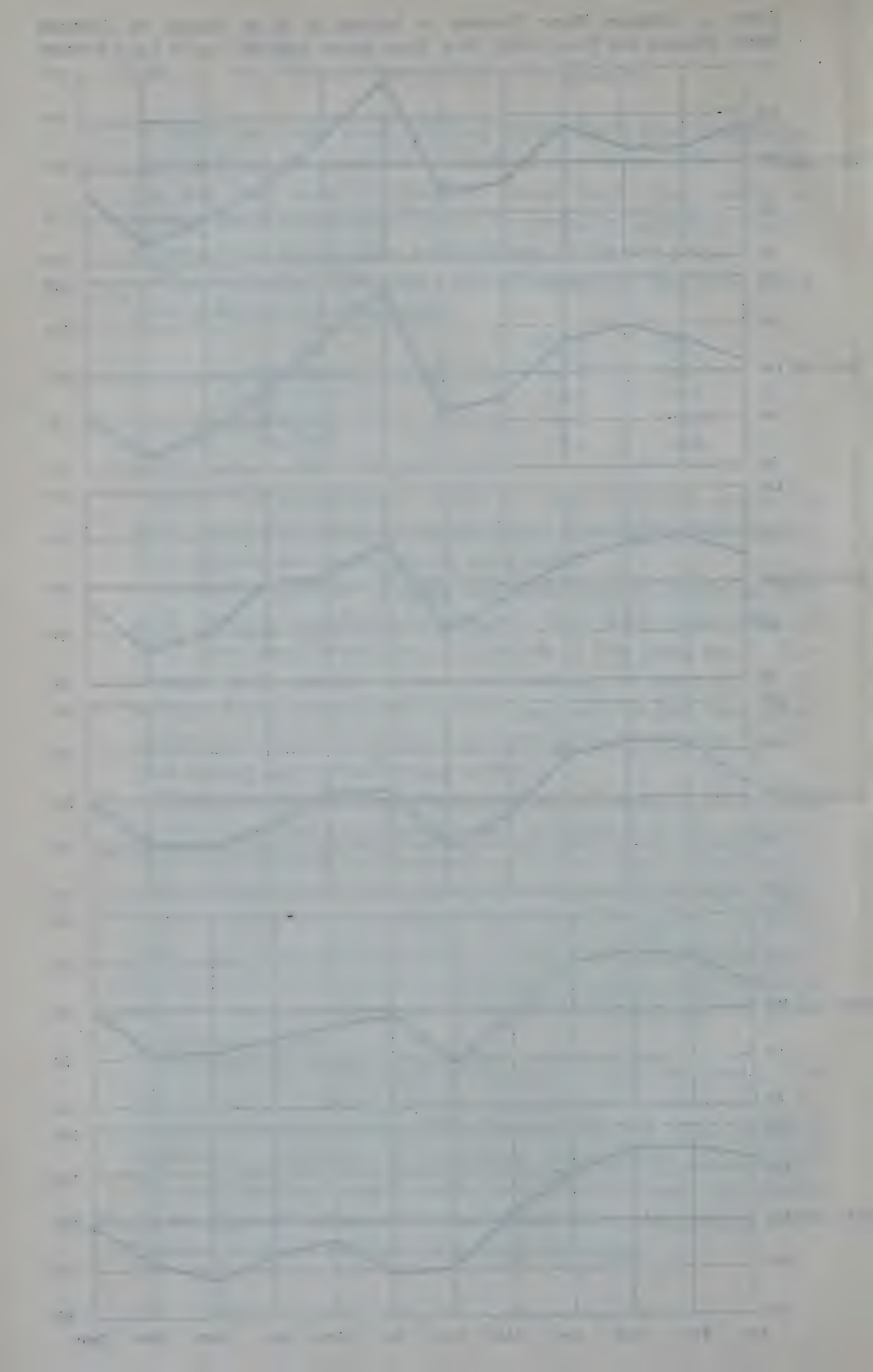
Deaths by months. A study has been made of deaths in New York State by month of occurrence. The thirty years 1888 to 1917 have been divided into six periods of five years each. The average daily number of deaths occurring in each of the 12 months during each of the six five-year periods has been determined, and stated in ratio to the average daily number for the year during each period, taken as 100.

This method eliminates the inequality in length of the months and the comparison is probably not invalidated by the improvement in promptness and completeness of death registration during the last thirty years. It is likely that deficiencies in death registration were more or less equally distributed throughout the year; hence, the average daily number of deaths in each month can be related to the average daily number for the year, taken as unity, and the ratios for the same month in different groups of years directly compared.

One possible disadvantage of this method may be noted. The average daily number of deaths for each month being stated in proportion to the average daily number for the whole year, it follows that a reduction in the average daily number of deaths for the year, due to a marked decline at some one season, may result in an apparent increase at some season where the average daily number of deaths may have remained unchanged.

RATIO OF AVERAGE DAILY NUMBER OF DEATHS IN EACH MONTH TO AVERAGE DAILY NUMBER FOR YEAR (=100), NEW YORK STATE: 1888-1917, BY 5 YEAR PERIODS





Ratio of Average Daily Number of Deaths In Each Month to Average Daily Number for Year (=100), New York State: 1888–1917, by 5-Year Periods.

	1913–1917	1908–1912	1903–1907	1898–1902	1893–1897	1888–1892
The year	100	100	100	100	100	100
January	113	105	103	106	102	108
February	115	111	112	110	107	103
March	115	112	112	108	110	103
April	110	110	109	105	107	108
May	102	99	97	97	95	96
June	90	89	90	91	92	94
July	89	99	102	109	118	118
August	96	97	101	102	108	106
September	93	94	94	100	97	96
October	88	91	90	90	88	89
November	91	91	91	87	83	84
December	99	100	100	97	93	95

This table and the graphs facing page 380 are worthy of careful study. It is instructive to follow the movement of each month in successive periods of time and to compare the relative positions of the months within each period.

Some of the more apparent results of such study may be mentioned. (1) The most conspicuous change has been in the position of July, which, during the first two periods examined, was frequently characterized by writers as the month of greatest mortality, but which has since undergone continuous decrease in rank sufficient to make it virtually the month of lowest relative mortality. This decrease — added to, in much less degree, by August — has brought the summer mortality below the level for the year in both the last two periods. (2) The position of the months of January, February, March, and April has been above that for the year in every period. (3) The positions relative to the months of April, June, September, November and December during the last three 5-year periods, and of October during all the six periods, have remained practically unchanged.

Death rate by months. For the twenty years 1898 to 1917, it has been possible to recalculate the annual death rate, by months, and to bring these into harmony with the published annual death rates. By this method, the position of any month is not necessarily affected by changes in others.

Chart (A), opposite, shows, in terms of annual rate, the crude death rate per 1,000 population at all ages for each month in each of the years 1898 to 1917; while (B) shows rates by months for each of the four 5-year periods therein.

Virtually the same features are apparent as those already observed by the proportionate method. The elimination of the July "peak," together with a less reduction in the rate for August, has brought the summer rates below the level for the year in both the last two 5-year periods.

Causes of death. The table on page 386 shows for New York State the rates per 100,000 total population at all ages from the important causes of death during 1917 compared with 1916 and the quinquennium 1911–1915.

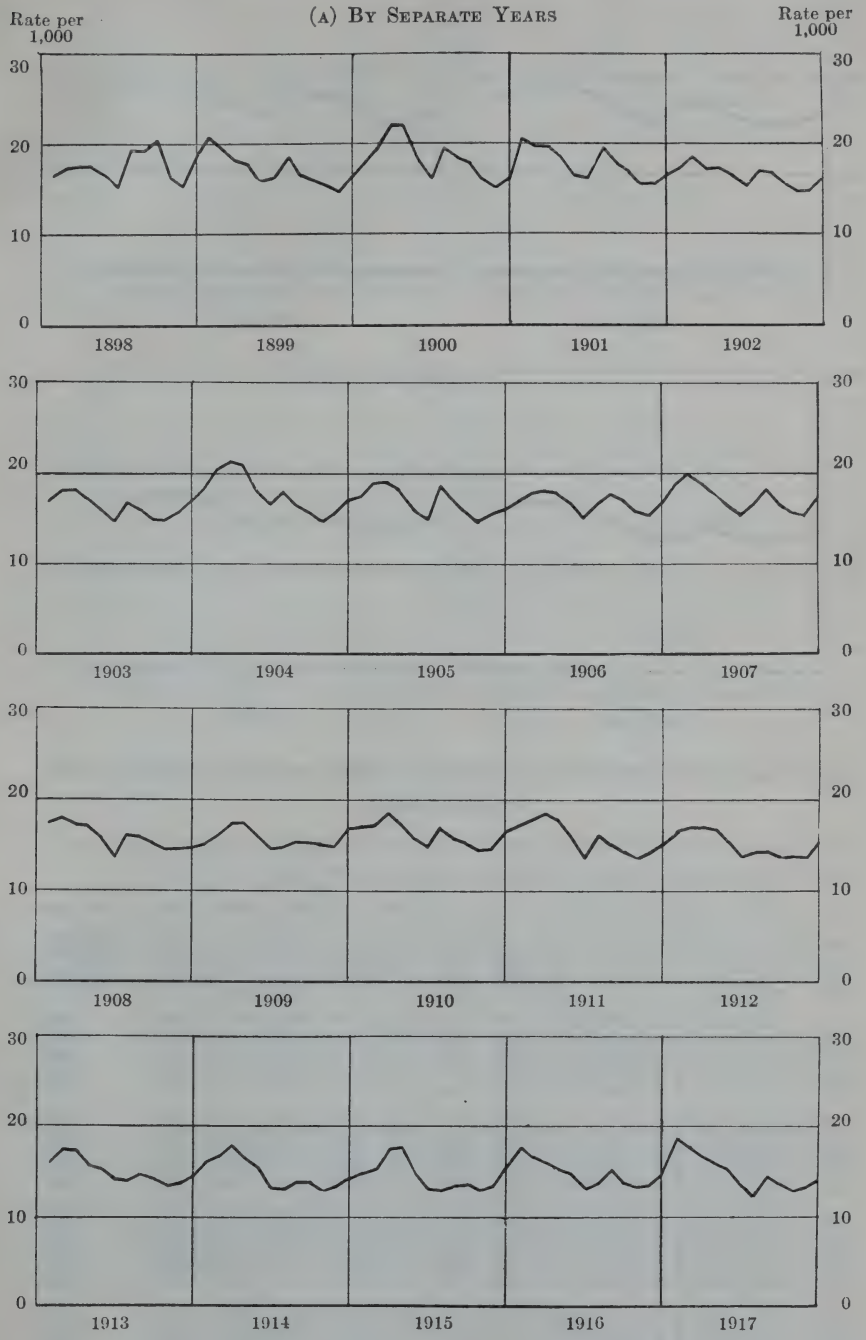
It should be observed that these rates for specific causes are ratios of deaths to total population at all ages. Unfortunately, it is impossible to present for a series of years rates by specific age periods. Such rates, relating deaths at any age to the lives actually at risk at that age and thus taking account of lives saved at early ages which increase the number of those living at later years of life, would furnish a much more certain measure of comparative mortality. In the absence of such death rates at specific ages, it is uncertain what part of the increased rates from those causes which affect adult and later ages is due to changed age composition of the population.

The graphic chart facing page 380 shows the movement of death rates from certain important causes over a period of years. It is so constructed that equal vertical distances represent equal ratios rather than equal absolute differences. The vertical distance from 1 to 2 is the same as that from 10 to 20, or 100 to 200, — each representing a 1:2 ratio. Lines plotted on such a chart show *rates of change* rather than numerical differences. If two lines change at the same rate, they will be parallel; if their rates of change are unequal, the one with the greater rate of change will be more nearly perpendicular.

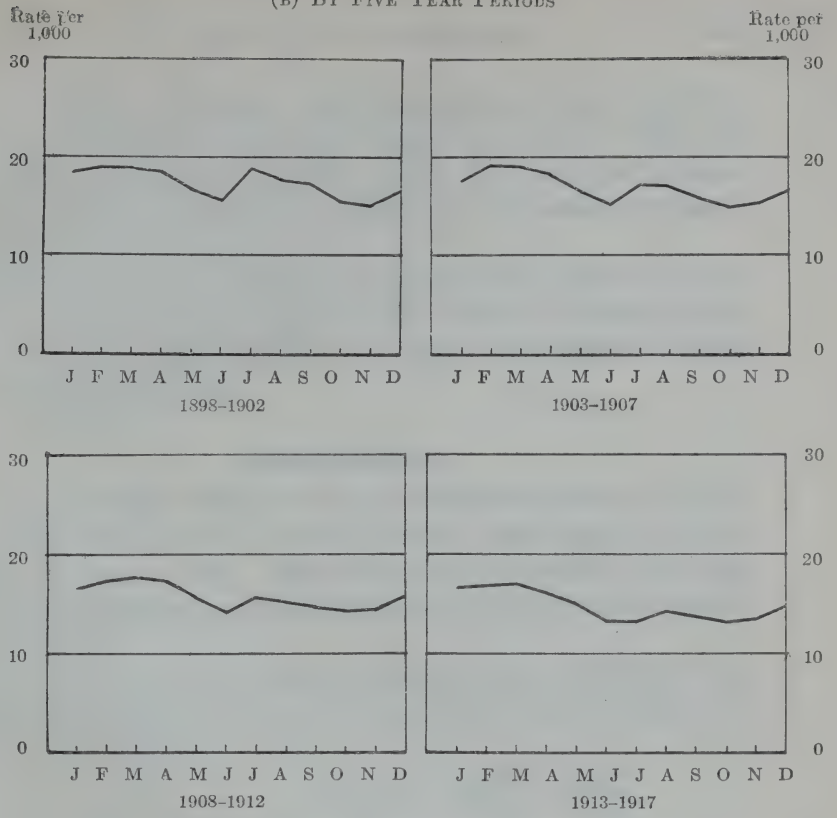
From the table and chart it is apparent that the death rates for those diseases against which public health efforts have in the main been directed—the common infectious diseases, typhoid

ANNUAL DEATH RATE PER 1,000 POPULATION, BY MONTHS, NEW YORK STATE, 1898 TO 1917

(A) BY SEPARATE YEARS



(b) By Five Year Periods



Annual Death Rate per 1,000 Population, by Months, New York State, 1898 to 1917

	Year	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898–1902	17.3	18.4	19.0	18.9	18.6	16.7	15.7	18.8	17.7	17.2	15.5	15.0	16.6
1903–1907	16.9	17.6	19.1	19.0	18.4	16.6	15.2	17.2	17.1	15.9	15.0	15.3	16.7
1908–1912	15.6	16.6	17.3	17.6	17.3	15.6	14.0	15.6	15.1	14.6	14.2	14.3	15.6
1913–1917	14.7	16.6	16.8	17.0	16.1	15.0	13.3	13.1	14.2	13.7	13.0	13.4	14.6
1898	17.4	16.4	17.3	17.5	17.6	16.6	15.2	19.4	19.2	20.2	16.4	15.4	18.5
1899	17.0	20.5	19.6	18.3	17.7	15.8	16.1	18.6	16.5	15.7	15.3	14.7	16.2
1900	18.1	17.7	19.5	22.0	21.9	18.3	16.0	19.4	18.4	17.7	15.9	15.0	16.0
1901	17.6	20.4	19.6	19.4	18.4	16.4	16.0	19.5	17.9	17.0	15.3	15.4	16.5
1902	16.3	17.1	18.4	17.1	17.3	16.4	15.2	17.0	16.7	15.5	14.5	14.5	15.9
1903	16.3	16.9	18.1	18.1	17.3	16.1	14.6	16.7	15.8	14.8	14.7	15.5	16.8
1904	17.7	18.3	20.3	21.2	20.9	18.0	16.5	17.9	16.4	15.6	14.5	15.5	17.1
1905	16.7	17.2	18.8	18.9	18.3	15.9	14.9	18.6	17.0	15.7	14.4	15.3	15.9
1906	16.8	16.8	17.7	18.2	17.9	16.8	14.9	16.7	17.6	16.9	15.8	15.2	16.7
1907	17.1	18.7	19.9	18.9	17.6	16.3	15.2	16.6	18.3	16.4	15.5	15.1	17.1
1908	15.8	17.5	18.1	17.2	17.1	15.7	13.7	16.0	15.9	15.1	14.4	14.4	14.6
1909	15.6	15.1	16.0	17.3	17.5	16.0	14.6	14.8	15.3	15.1	15.1	14.8	16.7
1910	16.1	17.0	17.2	18.6	17.4	15.6	14.8	16.9	15.8	15.3	14.3	14.6	16.6
1911	15.6	17.1	17.7	18.3	17.7	15.9	13.5	16.1	14.8	14.0	13.5	14.1	14.9
1912	14.9	16.2	16.7	16.8	16.6	15.1	13.5	14.2	14.2	13.5	13.7	13.5	15.2
1913	14.9	16.0	17.4	17.3	15.7	15.1	14.0	13.9	14.6	14.1	13.4	13.6	14.5
1914	14.7	16.0	16.7	17.9	16.4	15.4	13.1	13.0	13.7	13.6	12.8	13.4	14.3
1915	14.5	14.9	15.3	17.5	17.7	14.7	13.1	12.9	13.4	13.5	12.9	13.3	15.4
1916	14.7	17.6	16.5	15.9	15.1	14.7	13.1	13.6	15.1	13.6	13.0	13.5	14.7
1917	14.7	18.5	17.7	16.4	15.7	15.1	13.3	12.2	14.2	13.5	12.9	13.3	14.1

fever, infantile diarrhea, and tuberculosis—were materially lower in 1917 than during the 5 years 1911–1915. Thus the *percentage reduction in rate* from scarlet fever was 69; typhoid fever, 46; infant diarrhea, 24; diphtheria and measles, 12 each; tuberculosis (all forms), 6.

The death rates per 100,000 population at all ages from influenza, lobar pneumonia, organic heart disease, accidents, acute nephritis and Bright's disease, and cancer were higher in 1917 than during 1911–1915.

Infant mortality

Of the 154,127 deaths at all ages registered during 1917 in New York State, 22,476, or 14.6 per cent., were those of infants under one year of age. The rate of infant mortality resulting from these deaths, 91 per 1,000 births, is the lowest ever recorded in the State.*

The movement of the infant mortality rate in the State as a whole, in New York City, and the rest of the State, during recent years is given below.

	New York State	New York City	Rest of State
1914	99	95	105
1915	99	98	100
1916	94	93	96
1917	91	89	94

Infant mortality by districts. The infant mortality rates for the chief subdivisions of the State and for each city in 1917 and 1916 are shown in table on pages 413, 415.

Infant mortality by months. During the five years 1913–1917, the infant mortality rate has been highest in August and lowest in June.

* It should be noted, however, that there was a larger annual increase in the number of births during 1917 than in the years just previous. As probably about 70 per cent. of the deaths under one year of age during any year are of infants born in the same year, and about 30 per cent. are of infants born in the previous year, it follows that when there is an unusually large increase in the number of births, the denominator of the infant mortality ratio (deaths under one year per 1,000 living births) may be too large to represent the infant lives at risk, and the resulting rate may be too low. Conversely, a sudden decrease in the annual number of births, such as that caused in England and Wales by war conditions during 1917, might result in an overstatement of the infant mortality rate.

INFANT MORTALITY RATE* BY MONTHS: NEW YORK STATE, NEW YORK CITY AND STATE OUTSIDE NEW YORK CITY: 1913–1917

MONTH	New York State 1913–1917	New York City 1913–1917	Rest of State 1913–1917
January	96	92	101
February	100	94	108
March	101	96	107
April	100	98	102
May	97	99	93
June	81	80	81
July	96	95	97
August	130	130	130
September	118	108	130
October	90	82	100
November	85	82	89
December	87	82	93

* Deaths under 1 year of age per 1,000 live births.

Factors in infant mortality in the State (exclusive of New York City.) It is instructive to consider the various causes of death under one year of age. The following table shows, for the State outside of New York City, the number of male and female deaths from the chief causes under one year of age stated as ratios to male and female births, respectively.

CAUSE OF DEATH	DEATHS UNDER 1 PER 1,000 BIRTHS: 1915 TO 1917					
	1915		1916		1917	
	Male	Female	Male	Female	Male	Female
All causes	110.5	90.0	105.8	85.0	104.8	83.4
Common infectious diseases (6–9)*	3.5	2.8	3.5	3.5	3.3	3.6
Tuberculous diseases (28–35)	1.4	1.3	1.3	0.9	1.1	1.1
Respiratory diseases (89, 91, 92)	16.3	13.3	16.1	11.9	16.6	12.0
Diarrhea and enteritis (104)	24.1	21.8	21.2	19.2	21.9	17.3
Congenital causes (150–152)	47.7	38.0	47.8	37.4	47.3	37.7
Congenital malformations (150)	*7.9*	*5.9*	*8.7*	*6.0*	*7.1*	*6.9*
Premature; congenital debility (151)	*30.7*	*25.7*	*30.6*	*24.7*	*31.0*	*24.4*
Injuries, other congenital causes (152)	*9.2*	*6.4*	*8.5*	*6.7*	*9.2*	*6.4*
All other causes	17.3	12.8	15.9	12.2	14.7	11.7

* International list number.

In each of these three years, the male rate for all causes has been about 20 above the rate for females. One-half of this excess is charged to those causes existing, or produced, at birth. During these years, the greatest reduction for any specified cause was in the rate for diarrhea and enteritis.

Marriages

Marriages in New York State in 1917 numbered 104,800, or 20.0 persons marrying per 1,000 total population at all ages. This rate is one of the highest recorded in any year since registration began. The rates for 1916 and 1915 were 18.9 and 18.0, respectively. By five year periods, the movement of the marriage rate has been as follows:

	Persons marrying per 1,000 population
1885–1889	14.0
1890–1894	16.0
1895–1899	17.1
1900–1904	18.0
1905–1909	19.2
1910–1914	19.1

Refined marriage rate. The marriage rates just presented are ratios of persons marrying per 1,000 total population. If all persons under 15 years of age and all married persons are eliminated from the denominator in this ratio, there result refined marriage rates per 1,000 population among whom marriage is possible, i. e., single, widowed, and divorced persons 15 years old and over.

REFINED MARRIAGE RATE *

	(a) Persons	(b) Males	(c) Females
1890	42.1	43.5	40.8
1900	53.8	55.3	52.4
1910	57.4	57.5	57.2

* (a) Persons marrying per 1,000 marriageable persons.
(b) Males marrying per 1,000 marriageable males.
(c) Females marrying per 1,000 marriageable females.
Persons 15 years of age or over whose conjugal status was returned as "unknown" have been apportioned *pro rata* among the four conjugal groups.

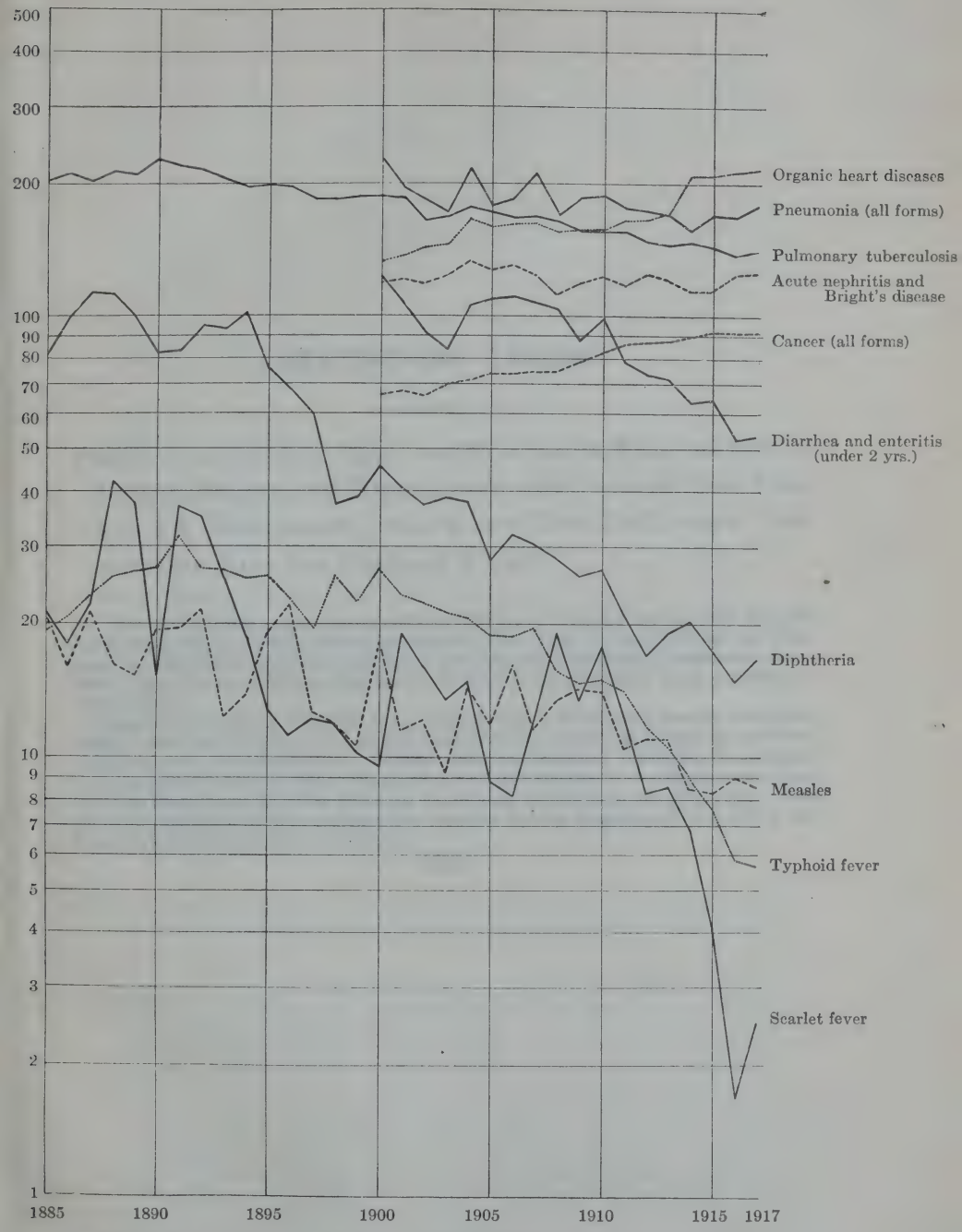
MOVEMENT OF MORTALITY BY IMPORTANT AGES AND FROM THE LEADING CAUSES OF DEATH IN NEW YORK STATE: 1917 COMPARED WITH 1916, AND WITH THE AVERAGE FOR THE QUINQUENNIUM 1911–1915

AGE OR CAUSE OF DEATH	1917		1916		1911–1915 (Annual average)		Increase or Decrease: 1917 over 1911–1915		Per cent of Change in Rate 1917 over 1911–1915	
	Number	Rate*	Number	Rate*	Number	Rate*	Number	Rate*	Increase	Decrease
Total deaths	154,127	14.7	151,543	14.7	145,186	14.9	+8,941	—0.2	.....	1.3
Under 1 year	22,473	91	22,731	94	24,570	106	—2,097	—15.	.....	14.2
1–4	8,955	85.4	10,887	105.7	10,071	103.5	—1,116	—18.1	.....	17.5
Total under 5 years	31,428	299.6	33,618	326.4	34,641	356.2	—3,213	—56.6	.....	15.9
5–64	79,052	753.5	76,068	738.5	62,600	643.6	+16,452	+109.9	17.1	.....
65 years and over	43,577	415.4	41,828	406.1	47,843	491.9	—4,266	—76.5	.....	15.6
Unknown	70	.....	29	.....	102	.....	—32	.....	.....	.....
Typhoid fever[1]†	593	5.7	603	5.9	1,023	10.5	—430	—4.8	.....	45.7
Measles[6]	904	8.6	928	9.0	956	9.8	—52	—1.2	.....	12.2
Scarlet fever[7]	259	2.5	178	1.7	775	8.0	—516	—5.5	.....	68.8
Whooping cough[8]	894	8.5	745	7.2	763	7.8	+131	+0.7	9.0	.....
Diphtheria[9]	1,755	16.7	1,524	14.8	1,845	19.0	—90	—2.3	.....	12.1
Influenza[10]	1,694	16.1	2,267	22.0	1,300	13.4	+394	+2.7	20.1	.....
Tuberculosis (all forms)[28–35]	16,632	158.5	15,820	153.6	16,338	168.0	+294	—9.5	.....	5.7
Pulmonary tuberculosis[28, 29]	14,795	141.0	14,069	136.6	14,338	147.4	+457	—6.4	.....	4.3
Tuberculous meningitis[30]	1,077	10.3	1,081	10.5	1,131	11.6	—54	—1.3	.....	11.2
Other forms[31–35]	760	7.2	670	6.5	869	8.9	—109	—1.	.....	19.1
Cancer (all forms)[39–45]	9,736	92.8	9,419	91.4	8,593	88.3	+1,143	+4.5	5.1	.....
Diabetes[50]	2,281	21.7	2,151	20.9	1,822	18.7	+459	+3.0	16.0	.....
Cerebrospinal meningitis[61b, c]	314	3.0	301	2.9	328	3.4	—14	—0.4	.....	11.8
Acute anterior poliomyelitis[63a]	92	0.9	3,351	32.5	121	1.2	—29	—0.3	.....	25.0
Cerebral hemorrhage, apoplexy[64]	6,796	64.8	6,471	62.8	6,109	62.8	+687	+2.0	3.2	.....
Organic heart disease and endocarditis[78, 79]	22,626	215.7	21,837	212.0	17,919	184.2	+4,707	+31.5	17.1	.....
Arteriosclerosis[81]	4,825	46.0	4,466	43.4	4,258	43.8	+567	+2.2	5.0	.....
Bronchitis[89, 90]	1,850	17.6	1,857	18.0	1,926	19.8	—76	—2.2	.....	11.1
Pneumonia (all forms)[91, 92]	18,673	178.0	17,314	168.1	16,449	169.1	+2,224	+8.9	5.3	.....
Bronchopneumonia[91]	6,604	62.9	6,942	67.4	7,023	72.2	—419	—9.3	.....	12.9
Lobar and unqualified[92]	12,069	115.0	10,372	100.7	9,426	96.9	+2,643	+18.1	18.7	.....
Diarrhea and enteritis (under 2 years)[104]	5,624	53.6	5,387	52.3	6,819	70.1	—1,195	—16.5	.....	23.5
Appendicitis[108]	1,191	11.4	1,231	12.0	1,176	12.1	+15	—0.7	.....	5.8
Hernia, intestinal obstruction[109]	1,285	12.2	1,267	12.3	1,202	12.4	+83	—0.2	.....	1.6
Cirrhosis of liver[113]	1,319	12.6	1,412	13.7	1,602	16.5	—283	—3.9	.....	23.6
Acute nephritis and Bright's disease[119–120]	13,136	125.2	12,801	124.3	11,506	118.3	+1,630	+6.9	5.8	.....
Diseases of the puerperal state[134–141]	1,333	12.7	1,231	12.0	1,334	13.7	—1	—1.0	.....	7.3
Puerperal septicemia[137]	469	4.5	429	4.2	467	4.8	+2	—0.3	.....	6.3
Congenital debility and malformations[150, 151]	7,784	74.2	7,868	76.4	8,213	84.4	—429	—10.2	.....	12.1
Old age[154]	885	8.4	1,015	9.9	1,510	15.5	—625	—7.1	.....	45.8
Accidents[164–181, 185, 186]	9,274	88.4	8,196	79.6	7,798	80.2	+1,476	+8.2	10.2	.....
Automobile accidents[176c]	1,066	10.2	820	8.0	486	5.0	+580	+5.2	104.0	.....
Drowning[169]	994	9.5	1,102	10.7	1,039	10.7	—45	—1.2	.....	11.2
Suicides[155–163]	1,441	13.7	1,492	14.5	1,490	15.3	—49	—1.6	.....	10.5
Homicides[182–184]	426	4.1	403	3.9	436	4.5	—10	—0.4	.....	8.9
All other causes	20,505	195.5	20,008	194.3	21,575	221.8	—1,070	—26.3	.....	11.9

* Total births and deaths per 1,000 population; deaths under 1 year per 1,000 living births (infant mortality rate); death rates for other ages and by causes per 100,000 total population

† International List of Causes of Death

MOVEMENT OF DEATH RATES PER 100,000 POPULATION FROM IMPORTANT CAUSES: NEW YORK STATE



This chart is so constructed that equal vertical distances represent equal *ratios* rather than equal absolute differences. Curves changing at the same *rate* are parallel; of two curves changing at different *rates*, the one with the greater *rate of change* is steeper.

STATISTICAL TABLES

Presenting and Analyzing the Results of Registration of Births, Deaths and Marriages in the State of New York and Its Subdivisions During the Year 1917, with Comparative Data for Previous Years*

* Prior to 1914 the original certificates of births and deaths were not filed with the State Department of Health from the cities of New York, Albany, Buffalo and Yonkers, the data for those cities included in the reports of the State Department being based upon the compilations prepared monthly by the respective local registrars of these cities.

Beginning January 1, 1914, the State Department of Health has been receiving the original certificates of births and deaths from all cities, towns and villages in the State, excepting only New York City. Unless otherwise indicated, therefore, the compilations presented in the monthly bulletins and annual reports of the Department since 1914 are based upon the data given on the original certificates, except for New York City, the figures for which are supplied monthly by the Registrar of Records of the New York City Department of Health.

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Table 1 — *Annual number of births, deaths and marriages in the State of New York, with rates per* 1,000 *estimated population:* **1885–1917**

YEAR	Estimated population*	Births (stillbirths excluded)	Deaths (stillbirths excluded)	Marriages	RATES PER 1,000 POPULATION		
					Births	Deaths	Persons marrying
1885	5,550,690	63,536	80,407	24,409	11.4	14.5	8.8
1886	5,642,720	89,828	86,801	36,764	15.9	15.4	13.0
1887	5,734,751	102,038	108,269	44,438	17.8	18.9	15.5
1888	5,826,782	103,089	114,584	43,683	17.7	19.7	15.0
1889	5,918,813	114,804	113,155	50,960	19.4	19.1	17.2
1890	6,013,722	112,572	128,648	41,195	18.7	21.4	13.7
1891	6,140,294	125,909	129,850	51,458	20.5	21.1	16.8
1892	6,266,866	130,143	131,388	52,725	20.8	21.0	16.8
1893	6,393,438	136,297	129,659	52,805	21.3	20.3	16.5
1894	6,520,010	141,827	123,423	52,539	21.8	18.9	16.1
1895	6,646,582	142,311	128,834	59,059	21.4	19.4	17.8
1896	6,773,154	147,327	126,253	58,990	21.8	18.6	17.4
1897	6,899,726	144,631	118,525	57,530	21.0	17.2	16.7
1898	7,026,298	138,702	122,584	57,392	19.7	17.4	16.3
1899	7,152,870	136,778	121,831	61,167	19.1	17.0	17.1
1900	7,284,461	143,156	132,089	63,225	19.7	18.1	17.4
1901	7,471,268	140,539	131,335	65,216	18.8	17.6	17.5
1902	7,658,075	146,740	124,830	68,903	19.2	16.3	18.0
1903	7,844,882	158,343	127,498	73,011	20.2	16.3	18.6
1904	8,031,689	165,014	142,217	74,677	20.5	17.7	18.6
1905	8,218,496	172,259	137,435	78,261	21.0	16.7	19.0
1906	8,405,303	183,012	141,099	87,870	21.8	16.8	20.9
1907	8,592,110	196,020	147,130	92,421	22.8	17.1	21.5
1908	8,778,917	203,159	138,912	73,644	23.1	15.8	16.8
1909	8,965,724	202,656	140,261	80,090	22.6	15.6	17.9
1910	9,152,532	213,235	147,710	85,490	23.3	16.1	18.7
1911	9,343,768	221,678	145,912	86,463	23.7	15.6	18.5
1912	9,535,004	227,120	142,377	97,427	23.8	14.9	20.4
1913	9,726,241	228,713	145,274	92,343	23.5	14.9	19.0
1914	9,917,477	240,038	145,476	93,793	24.2	14.7	18.9
1915	10,108,713	242,950	146,892	91,102	24.0	14.5	18.0
1916	10,299,702	240,817	151,543	97,474	23.4	14.7	18.9
1917	10,490,680	246,453	154,127	104,800	23.5	14.7	20.0

* For each of the years 1911–1917, the estimated population for the State is the sum of the estimates for New York City (based on U. S. Censuses of 1900 and 1910) and the State outside New York City (based on U. S. Census of 1910 and State census of 1915).

Table 2 — *Annual number of deaths in New York City and the rest of New York State with death rates per* 1,000 *estimated population:* **1898–1917**

YEAR	NEW YORK CITY †			REST OF STATE		
	Estimated population*	Deaths (still-births excluded)	Rate‡ per 1,000	Estimated population*	Deaths (still-births excluded)	Rate‡ per 1,000
1898	3,256,149	66,330	20.4	3,770,149	56,254	14.9
1899	3,350,611	65,347	19.5	3,802,259	56,484	14.9
1900	3,448,423	70,870	20.6	3,836,028	61,219	16.0
1901	3,583,074	70,722	19.7	3,888,194	60,613	15.6
1902	3,717,725	68,131	18.3	3,940,350	56,699	14.4
1903	3,852,376	67,808	17.6	3,992,506	59,690	15.0
1904	3,987,027	78,043	19.6	4,044,662	64,174	15.9
1905	4,121,678	73,714	17.9	4,096,818	63,721	15.6
1906	4,256,329	76,203	17.9	4,148,974	64,896	15.6
1907	4,390,980	79,205	18.0	4,201,130	67,925	16.2
1908	4,525,631	73,075	16.1	4,253,286	65,837	15.5
1909	4,660,283	74,105	15.9	4,305,441	66,156	15.4
1910	4,794,935	76,750	16.0	4,357,597	70,960	16.3
1911	4,929,586	75,423	15.3	4,414,182	70,489	16.0
1912	5,064,237	73,019	14.4	4,470,767	69,358	15.5
1913	5,198,888	73,903	14.2	4,527,353	71,371	15.8
1914	5,333,539	74,803	14.0	4,583,938	70,673	15.4
1915	5,468,190	76,193	13.9	4,640,523	70,699	15.2
1916	5,602,841	77,800	13.9	4,696,861	73,743	15.7
1917	5,737,492	78,575	13.7	4,753,188	75,552	15.9

Table 3 — *Deaths in the entire State, New York City and rest of State, by sex, color, marital condition and general nativity:* **1917**

	Total	New York City	Rest of State
Total deaths	154,127	78,575	75,552
Sex:			
Male	84,281	43,846	40,435
Female	69,846	34,729	35,117
Color or race:			
White	149,874	75,606	74,268
Negro	4,052	2,875	1,177
Chinese	92	80	12
Japanese	19	14	5
Indian	90	.....	90
Marital condition:			
Single	62,068	35,105	26,963
Married	56,744	27,791	28,953
Widowed and divorced	34,379	15,240	19,139
Unknown	936	439	497
General nativity:			
Native	102,471	45,534	56,937
Foreign-born	50,463	32,665	17,798
Unknown	1,193	376	817

* Since 1910, population estimates for New York City are based on U. S. censuses of 1900 and 1910; those for State outside New York City on U. S. census of 1910 and State census of 1915.

† Previous to 1910, the local figures for New York City differ somewhat from the State figures here given, but the divergences in rate are slight.

‡ Crude rates, taking no account of the more favorable age constitution of New York City. For standardized rates, see discussion of this subject in report for 1915, pages 312–316, 552–561, and accompanying charts.

Table 4 — *Number and percentage of deaths at each age period in the entire State, New York City and rest of State:* **1917**

	STATE OF NEW YORK		NEW YORK CITY		REST OF STATE	
	Deaths	Per cent	Deaths	Per cent	Deaths	Per cent
Total deaths — all ages..	154,127	100.0	78,575	100.0	75,552	100.0
Under 1 year.....	22,473	14.6	12,565	16.0	9,908	13.1
1.....	4,740	3.1	3,092	3.9	1,648	2.2
2.....	1,980	1.3	1,203	1.5	777	1.0
3.....	1,266	.8	788	1.0	478	.6
4.....	969	.6	614	.8	355	.5
Total under five years	31,428	20.4	18,262	23.2	13,166	17.4
5–9.....	2,853	1.9	1,700	2.2	1,153	1.5
10–14.....	1,730	1.1	969	1.2	761	1.0
15–19.....	2,821	1.8	1,573	2.0	1,248	1.7
20–24.....	4,649	3.0	2,579	3.3	2,070	2.7
25–29.....	5,527	3.6	3,119	4.0	2,408	3.2
30–34.....	6,182	4.0	3,646	4.6	2,536	3.4
35–39.....	7,120	4.6	4,271	5.4	2,849	3.8
40–44.....	8,046	5.2	4,848	6.2	3,198	4.2
45–49.....	8,916	5.8	5,236	6.7	3,680	4.9
50–54.....	10,004	6.5	5,843	7.4	4,161	5.5
55–59.....	10,343	6.7	5,450	6.9	4,893	6.5
60–64.....	10,861	7.0	5,427	6.9	5,434	7.2
65–69.....	11,180	7.3	4,824	6.1	6,356	8.4
70–74.....	11,096	7.2	4,370	5.6	6,726	8.9
75–79.....	9,404	6.1	3,209	4.1	6,195	8.2
80–84.....	6,737	4.4	1,941	2.5	4,796	6.3
85 years and over.....	5,160	3.3	1,308	1.7	3,852	5.1
Unknown.....	70	.1	.....	.....	70	.1

Table 5 — *Number of deaths in the State (exclusive of New York City) by age period, sex, color, general nativity, and marital condition:* **1917**

AGE AT DEATH	TOTAL DEATHS			COLOR							
				WHITE		NEGRO		INDIAN			
	Total	Male	Female	Male	Female	Male	Female	Male	Female	Chinese—male	Japanese—male
Total deaths	**75,552**	**40,435**	**35,117**	**39,699**	**34,569**	**668**	**509**	**51**	**39**	**12**	**5**
Under 1 year	9,908	5,680	4,228	5,598	4,150	75	73	6	5	1	.....
1	1,648	847	801	826	783	20	17	1	1	.....	.....
2	777	425	352	415	347	9	5	.....	.....	.....	1
3	478	266	212	263	205	2	7	1	.....	.....	.....
4	355	189	166	184	164	5	2	.....	.....	.....	.....
Total under 5	**13,166**	**7,407**	**5,759**	**7,286**	**5,649**	**111**	**104**	**8**	**6**	**1**	**1**
5–9	1,153	624	529	617	518	6	11	1	.....	.....	.....
10–14	761	406	355	399	340	5	12	2	3	.....	.....
15–19	1,248	671	577	647	552	21	21	3	4	.....	.....
20–24	2,070	1,150	920	1,102	888	45	28	3	4	.....	.....
25–29	2,408	1,372	1,036	1,330	1,012	37	22	3	2	2	.....
30–34	2,536	1,417	1,119	1,361	1,084	48	30	5	5	.....	3
35–39	2,849	1,680	1,169	1,634	1,141	43	28	1	.....	1	1
40–44	3,198	1,886	1,312	1,830	1,282	54	30	2	.....	.....	.....
45–49	3,680	2,148	1,532	2,088	1,499	54	33	3	.....	3	.....
50–54	4,161	2,378	1,783	2,322	1,742	48	39	6	2	2	.....
55–59	4,893	2,747	2,146	2,704	2,117	40	27	2	2	1	.....
60–64	5,434	3,023	2,411	2,991	2,389	30	21	1	1	1	.....
65–69	6,356	3,345	3,011	3,311	2,974	32	35	2	2	.....	.....
70–74	6,726	3,382	3,344	3,352	3,318	25	22	4	4	1	.....
75–79	6,195	3,008	3,187	2,972	3,167	33	19	3	1	.....	.....
80–84	4,796	2,158	2,638	2,143	2,628	15	8	.....	2	.....	.....
85–89	2,651	1,093	1,558	1,082	1,550	10	7	19	1	.....	.....
90–94	965	393	572	384	563	8	9	1	.....	.....	.....
95–99	206	74	132	74	131	.....	1	.....	.....	.....	.....
100 and over	30	17	13	17	11	.....	2	.....	.....	.....	.....
Unknown	70	56	14	53	14	3	.....	.....	.....	.....	.....

Table 5 — *Number of deaths in the State (exclusive of New York City) by age period, sex, color, general nativity, and marital condition:* **1917** — (Continued)

AGE AT DEATH	NATIVITY					
	NATIVE		FOREIGN		UNKNOWN	
	Male	Female	Male	Female	Male	Female
Total deaths	**30,140**	**26,797**	**9,676**	**8,122**	**619**	**198**
Under 1 year	5,652	4,206	16	12	12	10
1	843	791	4	9	.....	1
2	423	349	2	2	.....	1
3	264	205	2	3	.....	4
4	185	160	4	6	.....	.....
Total under 5	**7,367**	**5,711**	**28**	**32**	**12**	**16**
5–9	595	508	28	20	1	1
10–14	370	331	36	22	.....	2
15–19	611	496	58	80	2	1
20–24	890	766	237	151	23	3
25–29	939	785	405	247	28	4
30–34	928	827	451	287	38	5
35–39	1,081	818	538	342	61	9
40–44	1,253	968	577	333	56	11
45–49	1,400	1,144	688	381	60	7
50–54	1,533	1,297	776	476	69	10
55–59	1,932	1,605	758	532	57	9
60–64	2,144	1,747	829	647	50	17
65–69	2,300	2,032	1,008	963	37	16
70–74	2,273	2,225	1,072	1,095	37	24
75–79	2,014	2,170	966	993	28	24
80–84	1,460	1,778	682	843	16	17
85–89	720	1,075	365	473	8	10
90–94	261	413	129	155	3	4
95–99	45	86	28	43	1	3
100 and over	9	8	8	5	.....	.....
Unknown	15	7	9	2	32	5

Table 5 — *Number of deaths in the State (exclusive of New York City) by age period, sex, color, general nativity, and marital condition:* **1917** — (Concluded)

AGE AT DEATH	MARITAL CONDITION									
	SINGLE		MARRIED		WIDOWED		DIVORCED		UNKNOWN	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Total deaths	**15,810**	**11,153**	**17,189**	**11,764**	**6,845**	**12,058**	**145**	**91**	**446**	**51**
Under 1 year	5,680	4,228	.....	.....	.....	.....	....	....	....	.....
1	847	801	.....	.....	.....	.....	....	....	....	.....
2	425	352	.....	.....	.....	.....	....	....	....	.....
3	266	212	.....	.....	.....	.....	....	....	....	.....
4	189	166	.....	.....	.....	.....	....	....	....	.....
Total under 5	**7,407**	**5,759**	.....	.....	.....	.....	....	....	....	.....
5–9	624	529	.....	.....	.....	.....	....	....	....	.....
10–14	406	355	.....	.....	.....	.....	....	....	....	.....
15–19	661	493	7	84	.....	.....	....	....	3	.....
20–24	956	470	180	439	3	6	....	4	11	1
25–29	806	312	527	703	12	17	4	3	23	1
30–34	636	232	733	847	17	36	3	3	28	1
35–39	576	198	982	895	63	67	12	9	47	.....
40–44	574	226	1,152	945	101	128	14	5	45	8
45–49	576	222	1,344	1,070	156	221	18	16	54	3
50–54	508	279	1,577	1,135	221	350	20	11	52	8
55–59	480	262	1,856	1,289	347	582	21	11	43	2
60–64	432	319	2,003	1,195	534	890	18	3	36	4
65–69	391	319	2,111	1,194	803	1,488	14	6	26	4
70–74	310	367	1,991	953	1,049	2,016	14	6	18	2
75–79	223	326	1,462	634	1,310	2,218	3	5	10	4
80–84	147	258	848	257	1,150	2,111	2	5	11	7
85–89	63	153	315	99	708	1,300	1	3	6	3
90–94	16	52	82	18	294	500	....	....	1	2
95–99	2	16	11	2	61	113	....	1	....	.....
100 and over	3	2	3	1	10	10	1	....	....	.....
Unknown	13	4	5	4	6	5	....	....	32	1

Table 6 — *Number of births, stillbirths and deaths with birth, death and infant mortality rates, by months; deaths by broad age periods and important causes, by months: in entire State, New York City, and rest of State:* **1917**

	Births (still-births excluded)	Still-births	Deaths (still-births excluded)	Rates		
				Birth	Death	Infant mor-tality
Entire State	**246,453**	**9,971**	**154,127**	**23.5**	**14.7**	**91**
New York City	**141,564**	**6,115**	**78,575**	**24.7**	**13.7**	**89**
Rest of State	**104,889**	**3,856**	**75,552**	**22.1**	**15.9**	**94**
January, total	21,849	860	16,452	24.6	18.5	93
New York City	12,964	533	8,512	26.7	17.5	85
Rest of State	8,885	327	7,940	22.1	19.7	105
February, total	19,812	823	14,312	24.6	17.7	96
New York City	11,263	492	7,182	25.5	16.3	91
Rest of State	8,549	331	7,130	23.4	19.5	102
March, total	21,793	909	14,548	24.5	16.4	92
New York City	12,459	574	7,336	25.6	15.1	84
Rest of State	9,334	335	7,212	23.2	17.9	103
April, total	20,115	823	13,490	23.4	15.7	92
New York City	11,441	467	6,902	24.3	14.7	90
Rest of State	8,674	356	6,588	22.3	16.9	95
May, total	19,491	826	13,456	21.9	15.1	93
New York City	11,141	510	6,909	22.9	14.2	92
Rest of State	8,350	316	6,547	20.7	16.3	94
June, total	20,140	823	11,413	23.4	13.3	74
New York City	11,442	516	5,733	24.3	12.2	72
Rest of State	8,698	307	5,680	22.3	14.6	77
July, total	21,875	835	10,834	24.6	12.2	69
New York City	12,364	470	5,286	25.4	10.9	69
Rest of State	9,511	365	5,548	23.6	13.8	69
August, total	21,777	787	12,604	24.5	14.2	123
New York City	12,467	493	6,877	25.6	14.1	133
Rest of State	9,310	294	5,727	23.1	14.2	110
September, total	19,787	809	11,583	23.0	13.5	113
New York City	10,968	514	5,699	23.3	12.1	109
Rest of State	8,819	295	5,884	22.6	15.1	118
October, total	20,471	782	11,449	23.0	12.9	84
New York City	12,014	501	5,696	24.7	11.7	79
Rest of State	8,457	281	5,753	21.0	14.3	91
November, total	19,092	826	11,427	22.2	13.3	80
New York City	10,977	502	5,874	23.3	12.5	80
Rest of State	8,115	324	5,553	20.8	14.3	80
December, total	20,251	868	12,559	22.8	14.1	85
New York City	12,064	543	6,569	24.8	13.5	82
Rest of State	8,187	325	5,990	20.3	14.9	90

Table 6 — *Number of births, stillbirths and deaths with birth, death and infant mortality rates, by months; deaths by broad age periods and important causes, by months: in entire State, New York City, and rest of State:* **1917** — (Continued)

	Ages				
	Under 1 year	1 to 4	5 to 14	15 to 19	20 to 29
Entire State	**22,473**	**8,955**	**4,583**	**2,821**	**10,176**
New York City	**12,565**	**5,697**	**2,669**	**1,573**	**5,698**
Rest of State	**9,908**	**3,258**	**1,914**	**1,248**	**4,478**
January, total	2,034	691	349	250	995
New York City	1,104	408	210	143	606
Rest of State	930	283	139	107	389
February, total	1,896	700	317	234	875
New York City	1,027	441	183	143	514
Rest of State	869	259	134	91	361
March, total	2,004	825	406	232	944
New York City	1,046	532	238	126	540
Rest of State	958	293	168	106	404
April, total	1,847	839	397	279	872
New York City	1,025	541	236	163	462
Rest of State	822	298	161	116	410
May, total	1,810	829	411	251	941
New York City	1,027	562	230	125	529
Rest of State	783	267	181	126	412
June, total	1,488	727	442	219	812
New York City	819	479	274	120	463
Rest of State	669	248	168	99	349
July, total	1,516	712	410	234	815
New York City	855	454	208	133	414
Rest of State	661	258	202	101	401
August, total	2,675	879	380	251	871
New York City	1,654	590	234	146	443
Rest of State	1,021	289	146	105	428
September, total	2,232	803	360	186	751
New York City	1,192	471	209	97	411
Rest of State	1,040	332	151	89	340
October, total	1,725	627	366	199	735
New York City	955	375	216	105	419
Rest of State	770	252	150	94	316
November, total	1,522	572	352	236	763
New York City	876	354	192	120	436
Rest of State	646	218	160	116	327
December, total	1,724	751	393	250	802
New York City	985	490	239	152	461
Rest of State	739	261	154	98	341

Table 6 — *Number of births, stillbirths and deaths with birth, death and infant mortality rates, by months; deaths by broad age periods and important causes, by months: in entire State, New York City, and rest of State:* **1917** — (Continued)

	Ages — *Concluded*				
	30 to 39	40 to 49	50 to 59	60+	Unknown
Entire State	**13,302**	**16,962**	**20,347**	**54,438**	**70**
New York City	**7,917**	**10,084**	**11,293**	**21,079**	.....
Rest of State	**5,385**	**6,878**	**9,054**	**33,359**	**70**
January, total	1,401	1,811	2,226	6,693	2
New York City	885	1,116	1,276	2,764	.....
Rest of State	516	695	950	3,929	2
February, total	1,205	1,631	1,862	5,586	6
New York City	752	992	1,030	2,100	.....
Rest of State	453	639	832	3,486	6
March, total	1,274	1,635	1,970	5,252	6
New York City	778	984	1,097	1,995	.....
Rest of State	496	651	873	3,257	6
April, total	1,186	1,620	1,831	4,611	8
New York City	731	981	1,050	1,713	.....
Rest of State	455	639	781	2,898	8
May, total	1,215	1,479	1,843	4,669	8
New York City	724	892	1,034	1,786	.....
Rest of State	491	587	809	2,883	8
June, total	1,053	1,323	1,446	3,897	6
New York City	597	784	756	1,441	.....
Rest of State	456	539	690	2,456	6
July, total	1,022	1,225	1,432	3,464	4
New York City	569	685	750	1,218	.....
Rest of State	453	540	682	2,246	4
August, total	1,044	1,255	1,528	3,717	4
New York City	623	725	866	1,596	.....
Rest of State	421	530	662	2,121	4
September, total	958	1,199	1,432	3,658	4
New York City	539	678	765	1,337	.....
Rest of State	419	521	667	2,321	4
October, total	982	1,229	1,539	4,037	10
New York City	556	736	819	1,515	.....
Rest of State	426	493	720	2,522	10
November, total	954	1,212	1,566	4,243	7
New York City	555	708	881	1,752	.....
Rest of State	399	504	685	2,491	7
December, total	1,008	1,343	1,672	4,611	5
New York City	608	803	969	1,862	.....
Rest of State	400	540	703	2,749	5

Table 6 — *Number of births, stillbirths and deaths with birth, death and infant mortality rates, by months; deaths by broad age periods and important causes, by months: in entire State, New York City, and rest of State:* **1917** — (Continued)

	Typhoid fever (1)	Smallpox (5)	Measles (6)	Scarlet fever (7)	Whooping cough (8)	Diphtheria (9)	Influenza (10)	Tuberculosis (all forms) (23–35)	Pulmonary tuberculosis (28, 29)	Tuberculous meningitis (30)	Other forms of tuberculosis (31–35)
Entire State	**593**	**4**	**904**	**259**	**894**	**1,755**	**1,694**	**16,632**	**14,795**	**1,077**	**760**
New York City	**229**	....	**560**	**120**	**489**	**1,158**	**657**	**10,142**	**9,120**	**680**	**342**
Rest of State	**364**	**4**	**344**	**139**	**405**	**597**	**1,037**	**6,490**	**5,675**	**397**	**418**
January, total	40	....	70	16	30	165	515	1,485	1,366	67	52
New York City	10	....	29	7	10	107	220	947	883	45	19
Rest of State	30	....	41	9	20	58	295	538	483	22	33
February, total	44	....	91	17	44	157	396	1,426	1,266	88	72
New York City	21	....	49	6	21	110	134	888	803	54	31
Rest of State	23	....	42	11	23	47	262	538	463	34	41
March, total	40	....	74	35	44	178	257	1,623	1,448	116	59
New York City	14	....	46	21	12	128	94	994	890	74	30
Rest of State	26	....	28	14	32	50	163	629	558	42	29
April, total	38	....	117	42	51	173	138	1,611	1,425	117	69
New York City	11	....	81	16	20	130	43	965	846	79	40
Rest of State	27	....	36	26	31	43	95	646	579	38	29
May, total	39	1	146	37	49	143	120	1,541	1,364	109	68
New York City	17	....	103	19	20	108	30	939	839	70	30
Rest of State	22	1	43	18	29	35	90	602	525	39	38
June, total	36	1	150	23	56	143	33	1,419	1,219	125	75
New York City	13	....	102	8	27	106	14	838	719	82	37
Rest of State	23	1	48	15	29	37	19	581	500	43	38
July, total	47	1	99	20	80	107	15	1,296	1,140	99	57
New York City	20	....	55	10	47	73	8	765	684	57	24
Rest of State	27	1	44	10	33	34	7	531	456	42	33
August, total	67	....	38	7	140	85	16	1,259	1,100	93	66
New York City	26	....	21	2	93	52	8	766	672	55	39
Rest of State	41	....	17	5	47	33	8	493	428	38	27
September, total	84	1	23	7	149	103	21	1,272	1,136	78	58
New York City	30	....	13	2	95	59	10	782	711	49	22
Rest of State	54	1	10	5	54	44	11	490	425	29	36
October, total	65	....	13	12	81	152	48	1,217	1,089	62	66
New York City	37	....	7	4	46	75	15	726	662	35	29
Rest of State	28	....	6	8	35	77	33	491	427	27	37
November, total	59	....	19	16	85	168	50	1,182	1,074	51	57
New York City	19	....	11	9	50	99	32	709	659	37	13
Rest of State	40	....	8	7	35	69	18	473	415	14	44
December, total	34	....	64	27	85	181	85	1,301	1,168	72	61
New York City	11	....	43	16	48	111	49	823	752	43	28
Rest of State	23	....	21	11	37	70	36	478	416	29	33

Table 6—*Number of births, stillbirths and deaths with birth, death and infant mortality rates, by months; deaths by broad age periods and important causes, by months: in entire State, New York City, and rest of State:* **1917** — (Continued)

	Cancer (39–45)	Diabetes (50)	Cerebrospinal meningitis (61,b c)	Acute anterior poliomyelitis (63a)	Apoplexy and cerebral hemorrhage (64)	Organic heart disease(79)	Arteriosclerosis (81)	Bronchitis (89, 90)	Pneumonia (all forms) (91, 92)	Bronchopneumonia (91)
Entire State	**9,736**	**2,281**	**314**	**92**	**6,796**	**21,688**	**4,825**	**1,850**	**18,673**	**6,604**
New York City	**4,867**	**1,153**	**185**	**53**	**794**	**11,102**	**2,903**	**924**	**11,051**	**3,783**
Rest of State	**4,869**	**1,128**	**129**	**39**	**6,002**	**10,586**	**1,922**	**926**	**7,622**	**2,821**
January, total	853	266	21	15	652	2,410	559	295	3,288	1,062
New York City	419	140	15	9	63	1,237	348	149	1,954	598
Rest of State	434	126	6	6	589	1,173	211	146	1,334	464
February, total	773	188	18	7	604	2,058	428	264	2,475	864
New York City	374	90	11	4	59	1,038	258	121	1,345	469
Rest of State	399	98	7	3	545	1,020	170	143	1,130	395
March, total	894	207	33	10	631	2,044	480	202	2,218	796
New York City	461	93	23	3	77	1,028	292	99	1,199	389
Rest of State	433	114	10	7	554	1,016	188	103	1,019	407
April, total	785	208	45	3	590	1,899	370	166	1,810	621
New York City	383	99	25	.....	62	946	230	72	1,047	342
Rest of State	402	109	20	3	528	953	140	94	763	279
May, total	816	197	35	7	616	1,873	421	159	1,714	531
New York City	435	100	22	6	77	980	246	80	1,022	310
Rest of State	381	97	13	1	539	893	175	79	692	221
June, total	820	145	34	7	523	1,599	346	114	1,058	393
New York City	392	81	15	5	70	772	196	62	648	233
Rest of State	428	64	19	2	453	827	150	52	410	160
July, total	786	152	26	14	504	1,471	318	61	582	240
New York City	398	65	15	7	41	743	180	25	378	161
Rest of State	388	87	11	7	463	728	138	36	204	79
August, total	807	166	16	8	474	1,484	366	66	567	245
New York City	402	84	11	4	75	787	227	31	380	156
Rest of State	405	82	5	4	399	697	139	35	187	89
September, total	758	194	19	11	491	1,506	361	73	699	311
New York City	364	97	10	7	54	731	218	39	434	191
Rest of State	394	97	9	4	437	775	143	34	265	120
October, total	799	179	21	4	548	1,667	388	116	1,059	383
New York City	403	78	13	4	78	864	220	57	636	232
Rest of State	396	101	8	.....	470	803	168	59	423	151
November, total	820	193	23	5	540	1,774	372	134	1,376	474
New York City	400	113	10	3	69	963	243	70	864	292
Rest of State	420	80	13	2	471	811	129	64	512	182
December, total	825	186	23	1	623	1,903	416	200	1,827	684
New York City	436	113	15	1	69	1,013	245	119	1,144	410
Rest of State	389	73	8	.....	554	890	171	81	683	274

Table 6 — *Number of births, stillbirths and deaths with birth, death and infant mortality rates, by months; deaths by broad age periods and important causes, by months: in entire State, New York City, and rest of State:* **1917** — (Continued)

	Lobar pneumonia and unqualified (92)	Diarrhea and enteritis (under 2 years) (104)	Appendicitis (108)	Hernia, intestinal obstruction (109)	Cirrhosis of liver (113)	Nephritis and Bright's disease (119, 120)	Puerperal septicemia (137)	Other puerperal affections (134–36, 138–41)	Congenital malformations (150)	Premature birth (151a)
Entire State	**12,069**	**5,624**	**1,191**	**1,285**	**1,319**	**13,136**	**469**	**864**	**1,472**	**4,736**
New York City	**7,268**	**3,181**	**668**	**601**	**668**	**6,727**	**213**	**438**	**698**	**2,433**
Rest of State	**4,801**	**2,443**	**523**	**684**	**651**	**6,409**	**256**	**426**	**774**	**2,303**
January, total	2,226	201	93	127	132	1,437	49	79	154	431
New York City	1,356	88	46	55	70	759	8	43	74	216
Rest of State	870	113	47	72	62	678	41	36	80	215
February, total	1,611	212	105	77	129	1,230	46	77	112	375
New York City	876	122	59	33	64	651	24	40	44	191
Rest of State	735	90	46	44	65	579	22	37	68	184
March, total	1,422	231	106	94	110	1,276	55	80	137	444
New York City	810	112	64	46	62	635	23	44	63	211
Rest of State	612	119	42	48	48	641	32	36	74	233
April, total	1,189	261	101	92	133	1,186	57	71	125	439
New York City	705	142	54	41	63	668	39	34	65	243
Rest of State	484	119	47	51	70	518	18	37	60	196
May, total	1,183	267	110	105	121	1,184	50	90	122	401
New York City	712	139	57	49	58	582	25	51	52	205
Rest of State	471	128	53	56	63	602	25	39	70	196
June, total	665	235	95	111	119	1,040	32	62	123	338
New York City	415	137	53	60	58	538	14	36	61	144
Rest of State	250	98	42	51	61	502	18	26	62	194
July, total	342	445	118	120	114	947	28	71	118	379
New York City	217	279	72	55	49	439	10	37	53	201
Rest of State	125	166	46	65	65	508	18	34	65	178
August, total	322	1,556	115	131	100	913	31	75	114	385
New York City	224	1,018	69	68	46	468	16	34	54	184
Rest of State	98	538	46	63	54	445	15	41	60	201
September, total	388	1184	94	114	93	953	29	56	110	381
New York City	243	618	55	46	59	490	12	32	43	184
Rest of State	145	566	39	68	34	463	17	24	67	197
October, total	676	564	99	111	98	927	31	54	110	383
New York City	404	274	61	55	56	454	11	26	63	222
Rest of State	272	290	38	56	42	473	20	28	47	161
November, total	902	231	64	104	72	986	24	74	121	380
New York City	572	124	34	52	34	505	15	32	68	211
Rest of State	330	107	30	52	38	481	9	42	53	169
December	1,143	237	91	99	98	1,057	37	75	126	400
New York City	734	128	44	41	49	538	16	29	58	221
Rest of State	409	109	47	58	49	519	21	46	68	179

Table 6 — *Number of births, stillbirths and deaths with birth, death and infant mortality rates, by months; deaths by broad age periods and important causes, by months: in entire State, New York City, and rest of State:* **1917** — (Concluded)

	Congenital debility (151b)	Old age (154)	Total accidents (164–181, 185–186)	Railroad accidents (175a)	Automobile accidents (175c)	Drowning (169)	Other accidents	Suicides (155–163)	Homicides (182–184)	All other causes
Entire State	**1,576**	**885**	**9,274**	**831**	**1,066**	**994**	**6,383**	**1,441**	**426**	**21,439**
New York City	**954**	**271**	**4,716**	**98**	**518**	**504**	**3,596**	**778**	**248**	**9,594**
Rest of State	**622**	**614**	**4,558**	**733**	**548**	**490**	**2,787**	**663**	**178**	**11,845**
January, total	138	106	672	75	30	19	548	114	17	2,022
New York City	80	31	328	7	19	11	291	65	11	974
Rest of State	58	75	344	68	11	8	257	49	6	1,048
February, total	160	87	679	62	40	10	567	103	34	1,896
New York City	105	26	359	7	28	10	314	60	26	849
Rest of State	55	61	320	55	12	.....	253	43	8	1,047
March, total	151	74	668	70	43	40	515	111	37	2,004
New York City	92	21	365	11	27	21	306	63	22	929
Rest of State	59	53	303	59	16	19	209	48	15	1,075
April, total	136	64	687	69	75	92	451	147	35	1,910
New York City	79	18	363	5	42	67	249	79	18	866
Rest of State	57	46	324	64	33	25	202	68	17	1,044
May, total	126	63	704	70	87	78	469	140	30	2,029
New York City	74	20	355	3	44	32	276	70	16	952
Rest of State	52	43	349	67	43	46	193	70	14	1,077
June, total	89	56	706	65	91	139	411	155	48	1,697
New York City	59	11	362	15	43	71	233	76	30	745
Rest of State	30	45	344	50	48	68	178	79	18	952
July, total	96	73	958	73	116	251	518	138	47	1,603
New York City	60	24	414	9	54	104	247	66	29	668
Rest of State	36	49	544	64	62	147	271	72	18	935
August, total	164	71	1,450	83	144	190	1,023	103	39	1,791
New York City	116	20	884	5	60	92	727	52	26	853
Rest of State	48	51	566	78	84	98	306	51	13	938
September, total	192	81	740	57	162	81	440	114	37	1,633
New York City	115	30	317	5	55	41	216	70	17	666
Rest of State	77	51	423	52	107	40	224	44	20	967
October, total	142	64	697	76	110	48	463	108	39	1,653
New York City	77	18	308	8	54	27	219	55	16	737
Rest of State	65	46	389	68	56	21	244	53	23	916
November, total	103	70	690	63	117	32	478	125	34	1,533
New York City	50	24	333	10	59	18	246	71	20	637
Rest of State	53	46	357	53	58	14	232	54	14	896
December, total	79	76	623	68	51	14	490	83	29	1,668
New York City	47	28	328	13	33	10	272	51	17	718
Rest of State	32	48	295	55	18	4	218	32	12	950

Table 7 — (*a*) *Total births in the State (exclusive of New York City): and plural births, by color, nativity of mother, and*

	Total living births	White Mothers			Country of Birth			
		Native	Foreign-born	Unknown nativity	England	Ireland	Germany	Italy
Total living births	104,889	66,865	37,300	13	1,654	1,741	2,119	12,834
Sex:								
Males	54,209	34,528	19,336	3	921	877	1,101	6,622
Females	50,680	32,337	17,964	10	733	864	1,018	6,212
Attendant at birth:								
Physician	87,318	63,945	22,692	11	1,628	1,689	1,536	7,329
Midwife	16,757	2,583	14,145	1	18	41	564	5,280
Other	806	334	458	1	7	11	19	224
None or not stated	8	3	5	.....	1	.....	.....	1
Age of mother:								
Under 15 years	34	29	3	.....	.....	.....	.....	1
15–19	7,214	5,470	1,628	3	36	12	56	816
20–24	30,089	20,270	9,619	5	279	189	276	3,071
25–29	30,018	18,909	10,936	3	425	537	525	3,516
30–34	20,655	12,412	8,107	.....	501	494	562	2,862
35–39	12,424	7,173	5,178	.....	321	394	474	1,880
40–44	3,938	2,304	1,617	.....	81	102	204	606
45–49	363	198	162	.....	9	11	20	62
50 and over	7	2	5	.....	.....	.....	.....	5
Unknown or not stated	147	98	45	2	2	2	2	15
Order of birth:								
1st	30,172	22,926	7,018	7	462	394	349	1,759
2nd	23,148	16,092	6,919	3	406	377	316	1,863
3rd	16,608	10,257	6,253	2	324	313	311	2,080
4th	11,174	6,283	4,827	1	168	180	243	1,772
5th	7,773	3,978	3,740	.....	111	155	212	1,548
6th	5,604	2,708	2,853	.....	72	126	187	1,213
7th	3,732	1,736	1,966	.....	43	87	136	837
8th	2,466	1,076	1,376	.....	35	41	109	654
9th	1,639	692	927	.....	12	25	81	438
10th	1,061	472	581	.....	7	18	66	270
11th	681	296	375	.....	4	11	45	167
12th	397	168	224	.....	8	5	31	107
13th	207	93	108	.....	1	5	15	55
14th	100	39	59	.....	.....	2	9	28
15th	67	29	35	.....	1	1	7	16
16th	31	8	23	.....	.....	.....	1	17
17th	9	4	5	.....	.....	.....	.....	4
18th	5	3	2	.....	.....	.....	.....	2
19th	2	1	1	.....	.....	.....	.....	1
20th and over	2	.....	2	.....	.....	.....	.....	2
Unknown or not stated	11	4	6	.....	.....	1	1	1
Legitimacy:								
Legitimate	103,830	66,011	37,141	12	1,641	1,724	2,109	12,820
Illegitimate	1,059	854	159	1	13	17	10	14
Plural births:								
Twins	2,021	1,173	827	.....	42	31	54	300
Triplets	29	18	11	.....	.....	3	.....	7

showing sex, attendant at birth, age of mother, order of birth, legitimacy, country of birth of white foreign-born mothers: **1917**

Of White Foreign-born Mothers									Colored Mothers			
Russia	Russian Poland	Austria	Austrian Poland	Hungary	Poland not specified	Total Poland	Canada	Other foreign-born	Total colored	Negro	Indian	Chinese
3,748	2,015	5,317	1,086	1,016	1,782	4,883	2,100	1,888	711	662	45	4
1,903	1,065	2,722	577	527	911	2,553	1,108	1,002	342	321	20	1
1,845	950	2,595	509	489	871	2,330	992	886	369	341	25	3
2,510	701	2,278	227	363	719	1,647	2,050	1,662	670	623	44	3
1,200	1,283	2,979	840	644	1,050	3,173	40	206	28	26	1	1
38	30	60	19	9	13	62	9	19	13	13	.....	.....
.....	1	.....	.....	.....	.....	1	1	1	.....	.....	.....	.....
.....	1	.....	.....	1	.....	1	.....	.....	2	2	.....	.....
116	76	221	37	46	55	168	88	69	113	107	4	2
1,132	754	1,854	366	325	533	1,653	428	412	195	180	14	1
1,224	658	1,640	364	324	584	1,606	568	571	170	160	10	.....
728	346	925	200	198	333	879	519	439	136	126	9	1
435	134	510	81	102	210	425	354	283	73	66	7	.....
95	39	149	32	15	63	134	123	108	17	17	.....	.....
13	6	10	5	3	3	14	14	6	3	3	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	1	8	1	2	1	3	6	.....	2	1	1	.....
830	415	1,093	233	186	319	967	544	434	221	209	10	2
844	436	1,100	209	195	333	978	447	393	134	126	6	2
674	381	893	181	158	276	838	324	338	96	90	6	.....
504	265	707	143	152	236	644	228	229	63	49	14	.....
289	187	492	103	120	182	472	165	176	55	52	3	.....
231	123	353	82	87	149	354	112	118	43	41	2	.....
129	94	282	51	42	101	246	77	87	30	28	2	.....
109	49	155	28	33	59	136	63	41	14	13	1	.....
76	21	98	29	19	51	101	46	31	20	20	.....	.....
31	15	57	14	12	28	57	48	15	8	8	.....	.....
16	16	40	3	8	29	48	18	18	10	9	1	.....
9	7	22	5	2	11	23	11	6	5	5	.....	.....
1	3	12	3	.....	4	10	8	1	6	6	.....	.....
5	.....	7	1	.....	2	3	5	.....	2	2	.....	.....
.....	.....	2	1	2	1	2	4	.....	3	3	.....	.....
.....	1	3	.....	.....	.....	1	.....	1	.....	.....	.....	.....
.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	2	1	.....	.....	.....	2	.....	.....	1	1	.....	.....
3,732	2,008	5,284	1,080	1,006	1,774	4,862	2,084	1,879	666	621	41	4
16	7	33	6	10	8	21	16	9	45	41	4	.....
89	25	117	22	33	39	86	40	35	21	17	4	.....
.....	.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....

Table 7 — (*b*) *Total illegitimate births in the State (exclusive of New births, by color, nativity of mother, and country of*

	Total illegitimate living births	White Mothers			Country of Birth of		
		Native	Foreign-born	Unknown nativity	England	Ireland	Germany
Total illegitimate births	1,059	854	159	1	13	17	10
Sex:							
Males	510	403	84	.....	8	10	5
Females	549	451	75	1	5	7	5
Attendant at birth:							
Physician	978	816	119	1	12	16	9
Midwife	61	23	38	.....	1	1	1
Other	20	15	2	.....	.....	.....	.....
None or not stated	.....	.....	.....	.....	.....	.....	.....
Age of mother:							
Under 15 years	20	16	2	.....	.....	.....	.....
15–19	455	392	41	1	2	2	4
20–24	368	284	70	.....	10	10	2
25–29	121	94	24	.....	.....	4	1
30–34	52	38	9	.....	1	.....	.....
35–39	34	26	8	.....	.....	1	2
40–44	7	2	5	.....	.....	.....	1
45–49	1	1	.....	.....	.....	.....	.....
Unknown	1	1	.....	.....	.....	.....	.....
Plural births:							
Twins	26	26	.....	.....	.....	.....	.....
Total plural births	2,050	1,191	838	.....	42	34	54
Sex:							
Males	1,047	595	440	.....	23	19	30
Females	1,003	596	398	.....	19	15	24
Attendant at birth:							
Physician	1,737	1,151	565	.....	42	34	41
Midwife	301	36	265	.....	.....	.....	11
Other	12	4	8	.....	.....	.....	2
None or not stated	.....	.....	.....	.....	.....	.....	.....
Age of mother:							
Under 15 years	2	2	.....	.....	.....	.....	.....
15–19	54	35	19	.....	1	2	.....
20–24	402	269	129	.....	1	.....	.....
25–29	599	355	240	.....	14	14	10
30–34	529	285	241	.....	12	11	17
35–39	358	183	166	.....	10	4	23
40–44	100	58	41	.....	4	3	4
45–49	6	4	2	.....	.....	.....	.....

York City): showing sex, attendant at birth, age of mother, and plural birth of white foreign-born mothers: **1917** — (Concluded)

WHITE FOREIGN-BORN MOTHERS									COLORED MOTHERS		
Italy	Russia	Russian Poland	Austria	Austrian Poland	Hungary	Poland not specified	Canada	Other foreign-born	Total colored	Negro	Indian
14	16	7	33	6	10	8	16	9	45	41	4
9	5	3	20	3	5	5	5	6	23	20	3
5	11	4	13	3	5	3	11	3	22	21	1
10	12	6	18	3	3	5	16	9	42	38	4
3	4	1	14	3	7	3	.....	.....	.....	.....	.....
1	.....	.....	1	.....	.....	.....	.....	.....	3	3	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	.....	.....	.....	.....	1	.....	.....	.....	2	2	.....
5	2	1	11	1	3	1	6	3	21	21	.....
1	10	6	11	3	3	4	7	3	14	10	4
2	4	.....	7	.....	1	2	2	1	3	3	.....
1	.....	.....	3	1	2	.....	.....	1	5	5	.....
3	.....	.....	.....	.....	.....	1	.....	1	.....	.....	.....
1	.....	.....	1	1	.....	.....	1	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
307	89	25	117	23	33	39	40	35	21	17	4
148	52	13	64	16	16	13	26	20	12	11	1
159	37	12	53	7	17	26	14	15	9	6	3
200	72	7	56	8	17	17	40	31	21	17	4
107	17	16	59	15	16	22	.....	2	.....	.....	.....
.....	.....	2	2	.....	.....	.....	.....	2	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	4	.....	4	.....	.....	.....	4	.....	.....	.....	.....
31	20	6	33	7	8	11	4	8	4	4	.....
84	28	10	24	10	14	11	11	10	4	3	1
101	23	6	27	3	9	11	10	11	3	2	1
76	11	3	19	3	2	2	9	4	9	7	2
9	3	.....	10	.....	.....	4	2	2	1	1	.....
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Table 8 — *Number of births each month, in the entire State, New York City and rest of State, by sex and color; also number of stillbirths, by months:* **1917**

Month of Birth	Total living births	Sex		Color or Race					Stillbirths
		Male	Female	White	Negro	Indian	Chinese	Japanese	
State of New York	246,453	126,866	119,587	242,694	3,652	45	36	26	9,971
New York City	141,564	72,657	68,907	138,516	2,990	.....	36	22	6,115
Rest of State	104,889	54,209	50,680	104,178	662	45	....	4	3,856
January:									
State of New York	21,849	11,257	10,592	21,534	311	1	....	3	860
New York City	12,964	6,704	6,260	12,707	254	.....	....	3	533
Rest of State	8,885	4,553	4,332	8,827	57	1	....	....	327
February:									
State of New York	19,812	10,201	9,611	19,530	274	3	2	3	823
New York City	11,263	5,790	5,473	11,045	214	.....	2	2	492
Rest of State	8,549	4,411	4,138	8,485	60	3	....	1	331
March:									
State of New York	21,793	11,196	10,597	21,479	298	8	5	3	909
New York City	12,459	6,351	6,108	12,207	245	.....	5	2	574
Rest of State	9,334	4,845	4,489	9,272	53	8	....	1	335
April:									
State of New York	20,115	10,382	9,733	19,795	314	2	1	3	823
New York City	11,441	5,882	5,559	11,191	246	.....	1	3	467
Rest of State	8,674	4,500	4,174	8,604	68	2	....	....	356
May:									
State of New York	19,491	9,985	9,506	19,202	280	4	2	3	826
New York City	11,141	5,638	5,503	10,905	231	.....	2	3	510
Rest of State	8,350	4,347	4,003	8,297	49	4	....	....	316
June:									
State of New York	20,140	10,354	9,786	19,828	300	3	5	4	823
New York City	11,442	5,888	5,554	11,201	232	.....	5	4	516
Rest of State	8,698	4,466	4,232	8,627	68	3	....	....	307
July:									
State of New York	21,875	11,279	10,596	21,519	349	3	2	2	835
New York City	12,364	6,385	5,979	12,078	282	.....	2	2	470
Rest of State	9,511	4,894	4,617	9,441	67	3	....	....	365
August:									
State of New York	21,777	11,164	10,613	21,412	350	8	7	....	787
New York City	12,467	6,401	6,066	12,167	293	.....	7	....	493
Rest of State	9,310	4,763	4,547	9,245	57	8	....	....	294
September:									
State of New York	19,787	10,319	9,468	19,473	307	6	1	....	809
New York City	10,968	5,656	5,312	10,708	259	.....	1	....	514
Rest of State	8,819	4,663	4,156	8,765	48	6	....	....	295
Octob									
State of New York	20,471	10,510	9,961	20,167	295	3	6	....	782
New York City	12,014	6,184	5,830	11,761	247	.....	6	....	501
Rest of State	8,457	4,326	4,131	8,406	48	3	....	....	281
November:									
State of New York	19,092	9,859	9,233	18,799	282	4	3	4	826
New York City	10,977	5,625	5,352	10,726	245	.....	3	3	502
Rest of State	8,115	4,234	3,881	8,073	37	4	....	1	324
December:									
State of New York	20,251	10,360	9,891	19,956	292	.....	2	1	868
New York City	12,064	6,153	5,911	11,820	242	.....	2	....	543
Rest of State	8,187	4,207	3,980	8,136	50	.....	....	1	325

Table 9 — *Movement of infant and childhood mortality in State of New York: showing annual number of births registered, deaths at all ages, deaths of infants under one year of age, deaths under five years, infant mortality rate, and percentage of all deaths occurring under one year and under five years of age:* **1885–1917**

YEAR	Births registered* (stillbirths excluded)	Deaths at all ages (stillbirths excluded)	Deaths under 1 year (stillbirths excluded)	Deaths under 5 years	Deaths under 1 year per 1,000 living births	Per cent of deaths under 1 year to total deaths	Per cent of deaths under 5 years to total deaths
1885	63,536	80,407	.....	30,027	.....	.....	37.3
1886	89,828	86,801	.....	32,928	.....	.....	37.9
1887	102,038	108,269	.....	35,114	.....	.....	32.4
1888	103,089	114,584	.....	38,345	.....	.....	33.5
1889	114,804	113,155	.....	40,243	.....	.....	35.5
1890	112,572	128,648	.....	37,392	.....	.....	29.1
1891	125,909	129,850	.....	42,740	.....	.....	32.9
1892	130,143	131,388	.....	42,434	.....	.....	32.3
1893	136,297	129,659	.....	41,643	.....	.....	32.1
1894	141,827	123,423	.....	41,472	.....	.....	33.6
1895	142,311	128,834	.....	42,002	.....	.....	32.6
1896	147,327	126,253	.....	40,136	.....	.....	31.7
1897	144,631	118,525	.....	35,771	.....	.....	30.1
1898	138,702	122,584	.....	37,113	.....	.....	30.2
1899	136,778	121,831	.....	35,386	.....	.....	29.0
1900	143,156	132,089	.....	39,204	.....	.....	29.6
1901	140,539	131,335	.....	35,775	.....	.....	27.2
1902	146,740	124,830	.....	31,215	.....	.....	25.0
1903	158,343	127,498	.....	32,768	.....	.....	25.7
1904	165,014	142,217	24,909	39,086	151	17.5	27.5
1905	172,259	137,435	25,827	38,045	150	18.8	27.7
1906	183,012	141,099	27,114	39,290	148	19.2	27.9
1907	196,020	147,130	28,011	40,168	143	19.0	27.3
1908	203,159	138,912	26,561	37,941	131	19.1	27.3
1909	202,656	140,261	26,077	38,278	129	18.6	27.3
1910	213,235	147,710	27,534	39,848	129	18.6	27.0
1911	221,678	145,912	25,316	36,156	114	17.3	24.6
1912	227,120	142,377	24,681	34,787	109	17.3	24.4
1913	228,713	145,274	25,044	35,596	109	17.2	24.5
1914	240,038	145,476	23,731	33,082	99	16.3	22.7
1915	242,950	146,892	24,079	33,584	99	16.4	22.9
1916	240,817	151,543	22,731	33,618	94	15.0	22.2
1917	246,453	154,127	22,473	31,428	91	14.6	20.4

* Deaths under one year were not compiled separately until 1904. The registration of births was very incomplete for the early years and can scarcely be taken as approximately complete prior to 1908. On this account even for later years the infant mortality (*i. e.* ratio of deaths under one year per 1,000 living births) is too high.

Table 10 — *Movement of infant and childhood mortality in New York City and rest of New York State: showing annual number of births registered, birth rates, deaths at all ages, deaths under one year of age and under five years, and infant mortality rate:* **1905–1917**

YEAR	Total births * registered (stillbirths excluded)	Birth rate per 1,000 population	Total deaths at all ages (stillbirths excluded)	Deaths under 1 year (stillbirths excluded)	Deaths under 5 years	Deaths under 1 year per 1,000 living births
1905:						
New York City	103,881	25.2	73,714	16,435	24,539	158
Rest of State	68,378	16.7	63,721	9,392	13,506	137
1906:						
New York City	111,773	26.2	76,203	17,165	25,752	154
Rest of State	71,239	17.2	64,896	9,949	13,538	140
1907:						
New York City	120,716	27.5	79,205	17,513	25,812	145
Rest of State	75,304	17.9	67,925	10,498	14,356	139
1908:						
New York City	126,862	28.0	73,075	16,211	24,134	128
Rest of State	76,297	17.9	65,837	10,350	13,807	136
1909:						
New York City	122,367	26.3	74,105	15,944	24,496	130
Rest of State	80,289	18.6	66,156	10,133	13,782	126
1910:						
New York City	129,081	26.9	76,750	16,202	24,278	126
Rest of State	84,154	19.3	70,960	11,332	15,570	135
1911:						
New York City	134,541	27.3	75,423	15,016	22,233	112
Rest of State	87,137	19.7	70,489	10,300	13,923	118
1912:						
New York City	135,581	26.8	73,019	14,266	20,984	105
Rest of State	91,539	20.5	69,358	10,415	13,803	114
1913:						
New York City	135,123	26.0	73,903	13,782	20,715	102
Rest of State	93,590	20.7	71,371	11,262	14,881	120
1914:						
New York City	140,528	26.3	74,803	13,295	19,531	95
Rest of State	99,510	21.7	70,673	10,436	13,551	105
1915:						
New York City	141,354	25.9	76,193	13,865	20,290	98
Rest of State	101,596	21.9	70,699	10,214	13,294	100
1916:						
New York City	137,287	24.5	77,800	12,819	19,967	93
Rest of State	103,530	22.0	73,743	9,912	13,651	96
1917:						
New York City	141,564	24.7	78,575	12,565	18,262	89
Rest of State	104,889	22.1	75,552	9,908	13,166	94

* Registration of births known to be incomplete until recent years, particularly in the State outside of New York City. Consequently recorded birth rates in earlier years for rest of State are too low and corresponding infant mortality rates (ratio of deaths under 1 year per 1,000 living births) too high.

Table 11 — *General summary for New York City, and rest of State by individual counties: showing the number of births, still-births, deaths and marriages with annual birth, death and marriage rates per* 1,000 *estimated population*: **1917**

County No.	AREA	Population * (estimated) 1917	Total births (still-births excluded)	Still-births	Total deaths (still-births excluded)	Total marriages	Birth rate	Death rate	Marriage rate (persons marrying)
	State of New York	**10,490,680**	**246,453**	**9,971**	**154,127**	**104,800**	**23.5**	**14.7**	**20.0**
	New York City	**5,737,492**	**141,564**	**6,115**	**78,575**	**59,210**	**24.7**	**13.7**	**20.6**
	Rest of State	**4,753,188**	**104,889**	**3,856**	**75,552**	**45,590**	**22.1**	**16.9**	**19.2**
1	Albany	187,143	3,755	138	3,194	1,855	20.1	17.1	19.8
2	Allegany	39,766	689	26	589	317	17.3	14.8	15.9
3	Broome	95,280	2,653	92	1,928	1,271	27.8	20.2	26.7
4	Cattaraugus	75,491	1,413	63	1,015	841	18.7	13.4	22.3
5	Cayuga	65,196	1,297	59	1,051	634	19.9	16.1	19.4
6	Chautauqua	121,348	2,427	87	1,623	1,698	20.0	13.4	28.0
7	Chemung	60,723	1,453	60	1,070	757	23.9	17.6	24.9
8	Chenango	37,098	615	30	664	306	16.6	17.9	16.5
9	Clinton	47,297	1,090	37	682	435	23.0	14.4	18.4
10	Columbia	44,279	841	28	716	428	19.0	16.2	19.3
11	Cortland	30,406	575	30	570	265	18.9	18.7	17.4
12	Delaware	46,180	912	33	694	355	19.7	15.0	15.4
13	Dutchess	92,335	1,925	54	1,821	806	20.8	19.7	17.5
14	Erie	588,059	16,509	603	9,449	6,762	28.1	16.1	23.0
15	Essex	32,045	758	30	595	276	23.7	18.6	17.2
16	Franklin	46,386	1,024	38	807	342	22.1	17.4	14.7
17	Fulton	46,021	884	40	700	452	19.2	15.2	19.6
18	Genesee	41,914	841	39	548	321	20.1	13.1	15.3
19	Greene	30,055	453	21	500	229	15.1	16.6	15.2
20	Hamilton	4,547	73	2	42	19	16.1	9.2	8.4
21	Herkimer	67,164	1,631	40	1,034	592	24.3	15.4	17.6
22	Jefferson	81,256	1,694	61	1,346	821	20.8	16.6	20.2
24	Lewis	26,415	464	16	380	181	17.6	14.4	13.7
25	Livingston	38,571	760	14	693	284	19.7	18.0	14.7
26	Madison	42,726	778	21	666	360	18.2	15.6	16.9
27	Monroe	333,002	8,354	317	4,993	3,390	25.1	15.0	20.4
28	Montgomery	62,281	1,406	51	886	627	22.6	14.2	20.1
29	Nassau	129,733	2,524	97	1,444	992	19.5	11.1	15.3
31	Niagara	115,025	3,143	94	1,713	1,290	27.3	14.9	22.4
32	Oneida	172,367	4,565	179	3,140	1,324	26.5	18.2	15.4
33	Onondaga	219,092	5,613	203	3,534	2,608	25.6	16.1	23.8
34	Ontario	55,567	1,138	40	876	420	20.5	15.8	15.1
35	Orange	118,844	2,273	80	2,100	1,071	19.1	17.7	18.0
36	Orleans	34,676	588	26	421	226	17.0	12.1	13.0
37	Oswego	77,602	1,500	54	1,162	573	19.3	15.0	14.8
38	Otsego	49,075	800	34	780	372	16.3	15.9	15.2
39	Putnam	11,998	210	3	164	97	17.5	13.7	16.2
40	Rensselaer	120,944	2,070	74	2,266	1,095	17.1	17.8	18.1
43	Rockland	46,881	867	25	683	333	18.5	14.6	14.2
44	St. Lawrence	90,846	1,853	108	1,653	777	20.4	18.2	17.1
45	Saratoga	63,415	1,198	55	1,003	494	18.9	15.8	15.6
46	Schenectady	102,489	2,693	76	1,313	1,107	26.3	12.8	21.6
47	Schoharie	22,688	377	18	409	186	16.6	18.0	16.4
48	Schuyler	13,951	275	9	268	109	19.7	19.2	15.6
49	Seneca	24,568	416	15	689	171	16.9	28.0	13.9
50	Steuben	83,729	1,562	61	1,431	833	18.7	17.1	19.9
51	Suffolk	107,483	1,933	65	2,452	843	18.0	22.8	15.7
52	Sullivan	39,955	573	24	672	277	14.3	16.8	13.9
53	Tioga	25,538	406	12	423	269	15.9	16.6	21.1
54	Tompkins	37,696	678	23	588	346	18.0	15.6	18.4
55	Ulster	82,718	1,358	64	1,290	623	16.4	15.6	15.1
56	Warren	33,271	587	41	507	283	17.6	15.2	17.0
57	Washington	46,616	885	38	662	433	19.0	14.2	18.6
58	Wayne	54,773	911	30	758	388	16.6	13.8	14.2
59	Westchester	336,256	7,676	235	4,191	3,066	22.8	12.5	18.2
60	Wyoming	33,476	667	25	423	254	19.9	12.6	15.2
61	Yates	18,932	276	18	281	106	14.6	14.8	11.2

* Population estimates based upon U. S. censuses of 1900 and 1910 for New York City and on U. S. census of 1910 and State census of 1915 for remainder of State.

Table 12 — *General summary for each city of the State: showing the number of births, stillbirths, deaths, and deaths under one year, during* 1917, *with corresponding birth and death rates for* 1917, *in comparison with* 1912–1916; *also infant mortality rates for* 1917 *and* 1916

(Also revised death rates for certain cities with large State institutions, after the exclusion of deaths in those institutions.)

	CITY	Population* (estimated) 1917	Total births (stillbirths excluded)	Still-births	Total deaths (stillbirths excluded)	Deaths under 1 year
1	**State of New York**	**10,490,680**	**246,453**	**9,971**	**154,127**	**22,473**
2	**New York City**	**5,737,492**	**141,564**	**6,115**	**78,575**	**12,565**
3	**Rest of State**	**4,753,188**	**104,889**	**3,856**	**75,552**	**9,908**
4	**Cities**	**2,319,149**	**60,922**	**2,344**	**38,947**	**6,157**
5	**Rural¶**	**2,434,039**	**43,967**	**1,512**	**36,605**	**3,751**
6	I Cities over 175,000	728,857	20,423	784	11,752	1,984
7	Buffalo‡	466,196	13,468	505	7,664	1,403
8	Rochester‡	262,661	6,955	279	4,088	581
9	II Cities, 50,000–175,000	650,936	16,944	638	11,226	1,743
10	Albany	111,027	2,254	96	2,029	245
11	Binghamton‡	55,667	1,607	60	1,226	170
12	Schenectady	83,153	2,366	69	1,100	229
13	Syracuse‡	148,175	4,218	166	2,438	430
14	Troy	†74,949	1,428	68	1,654	201
15	Utica‡	82,873	2,561	103	1,577	259
16	Yonkers	95,092	2,510	76	1,202	209
17	IIIa Cities, 20,000–50,000	497,264	12,518	501	8,049	1,200
18	Amsterdam	35,412	971	37	485	89
19	Auburn‡	†31,551	832	45	547	70
20	Cohoes	†22,911	571	9	435	85
21	Elmira‡	41,235	1,112	48	748	88
22	Gloversville	21,357	474	25	350	39
23	Jamestown	40,283	850	32	525	72
24	Kingston	26,524	480	21	520	45
25	Mount Vernon	40,146	902	34	419	50
26	Newburgh	27,879	576	26	539	54
27	New Rochelle	32,770	704	32	358	66
28	Niagara Falls	46,913	1,677	60	719	206
29	Oswego	26,232	553	25	367	49
30	Poughkeepsie	34,578	847	14	545	92
31	Rome‡	22,444	778	43	676	76
32	Watertown	26,936	718	28	558	86
33	White Plains	20,093	473	22	258	33
34	IIIb Cities, 10,000–20,000	349,339	8,907	333	6,313	1,049
35	Batavia‡	13,920	341	17	244	38
36	Corning	†13,346	355	10	266	37
37	Cortland	12,707	293	14	273	32
38	Dunkirk	17,923	594	15	311	62
39	Fulton	11,373	308	14	161	27
40	Geneva	13,542	379	15	237	34
41	Glens Falls	16,745	298	23	279	28
42	Hornell	14,638	290	10	194	23
43	Hudson‡	11,576	331	9	231	37
44	Ithaca	17,524	353	13	273	18
45	Johnstown	10,771	201	7	141	17
46	Lackawanna	16,212	926	26	448	260
47	Little Falls	13,300	417	13	230	42
48	Lockport	18,973	388	20	331	36
49	Middletown‡	16,815	382	11	442	25
50	North Tonawanda	14,084	501	6	210	59

* Population estimates based upon United States censuses of 1900 and 1910 for New York City and on United States census of 1910 and State census of 1915 for remainder of State.

¶ "Rural," as used in this table, includes all territory outside the 57 upstate cities and 3 large villages here listed.

‡ Cities in which State institutions are located, deaths of the latter being included to allow of comparability with other places or periods. Revised rates for 1917 excluding these deaths are shown in last column of this table page 413.

† Certain cities for which a decrease was shown in populalion from 1910 to 1915 are represented by rates based on the State census, 1915.

Table 12 — *General summary for each city of the State: showing the number of births, stillbirths, deaths, and deaths under one year, during* 1917, *with corresponding birth and death rates for* 1917, *in comparison with* 1912–1916; *also infant mortality rates for* 1917 *and* 1916 — (Continued)

	CITY	BIRTH RATES		DEATH RATES		INFANT MORTALITY RATES		AFTER EXCLUSION OF STATE INSTITUTIONS	
		1917	Annual average 1912–1916	1917	Annual average 1912–1916	1917	1916	Deaths 1917	Death rate
1	**State of New York**	**23.5**	**23.8**	**14.7**	**14.8**	**91**	**94**	.....	.....
2	**New York City**	**24.7**	**25.9**	**13.7**	**14.1**	**89**	**93**	.....	.....
3	**Rest of State**	**22.1**	**21.4**	**15.9**	**15.5**	**94**	**96**	.....	.....
4	**Cities**	**26.3**	**24.6**	**16.8**	**16.0**	**101**	**105**	.....	.....
5	**Rural**	**18.1**	**20.1**	**15.0**	**16.5**	**85**	**84**	.....	.....
6	I Cities over 175-000	28.0	.....	16.1	.....	97	104	.....	.....
7	Buffalo‡	28.9	27.5	16.4	15.6	104	114	7,462	16.0
8	Rochester‡	26.5	26.1	15.6	14.4	84	86	3,867	14.7
9	II Cities, 50,000–175,000	26.0	.....	17.2	.....	103	100	.....	.....
10	Albany	20.3	19.6	18.3	19.6	109	97	.....	.....
11	Binghamton‡	28.9	24.6	22.0	20.1	106	139	1,012	18.2
12	Schenectady	28.5	26.0	13.2	12.9	97	79	.....	.....
13	Syracuse‡	28.5	23.4	16.5	15.4	102	99	2,428	16.4
14	Troy	18.9	17.9	21.9	19.9	141	97	.....	.....
15	Utica‡	30.9	29.5	19.0	19.3	101	111	1,432	17.3
16	Yonkers	26.4	28.0	12.6	13.1	83	90	.....	.....
17	IIIa Cities, 20,000–50,000	25.2	.....	16.2	.....	96	104	.....	.....
18	Amsterdam	27.4	27.7	13.7	14.6	92	106	.....	.....
19	Auburn‡	25.6	22.6	16.8	17.3	84	84	538	16.6
20	Cohoes	24.4	25.1	18.6	16.7	149	126	.....	.....
21	Elmira‡	27.0	20.0	18.1	15.5	79	96	747	18.1
22	Gloversville	22.2	19.7	16.4	15.3	82	144	.....	.....
23	Jamestown	21.1	22.0	13.0	12.0	85	97	.....	.....
24	Kingston	18.1	17.2	19.6	18.4	94	94	.....	.....
25	Mount Vernon	22.5	24.4	10.4	11.6	55	89	.....	.....
26	Newburgh	20.7	19.8	19.3	18.2	94	86	.....	.....
27	New Rochelle	21.5	23.6	10.9	11.8	94	70	.....	.....
28	Niagara Falls	35.7	33.5	15.3	14.7	123	132	.....	.....
29	Oswego	21.1	21.0	14.0	15.6	89	114	.....	.....
30	Poughkeepsie	24.5	23.5	15.8	16.8	109	117	.....	.....
31	Rome‡	34.7	28.1	30.1	23.9	98	101	591	26.3
32	Watertown	26.7	20.9	20.7	17.1	120	130	.....	.....
33	White Plains	23.5	26.5	12.8	14.3	70	69	.....	.....
34	IIIb Cities, 10,000–20,000	25.5	.....	18.1	.....	118	127	.....	.....
35	Batavia‡	24.5	24.9	17.5	18.0	111	107	.....	.....
36	Corning	26.4	20.9	19.8	15.9	104	99	.....	.....
37	Cortland	23.1	20.8	21.5	17.5	109	100	.....	.....
38	Dunkirk	33.1	30.3	17.4	13.7	104	109	.....	.....
39	Fulton	27.1	26.6	14.2	17.0	88	128	.....	.....
40	Geneva	28.0	23.3	17.5	16.3	90	88	.....	.....
41	Glens Falls	17.8	19.5	16.7	17.1	94	86	.....	.....
42	Hornell	19.8	18.4	13.3	15.4	79	86	.....	.....
43	Hudson‡	28.6	25.8	20.9	19.1	112	157	230	19.9
44	Ithaca	20.1	18.5	15.6	15.6	51	88	.....	.....
45	Johnstown	18.7	17.6	13.1	12.4	85	44	.....	.....
46	Lackawanna	57.1	44.1	27.6	25.0	281	319	.....	.....
47	Little Falls	31.4	32.5	17.3	18.1	101	112	.....	.....
48	Lockport	20.5	18.4	17.4	15.8	93	98	.....	.....
49	Middletown‡	16.8	17.4	26.3	23.5	89	67	284	16.9
50	No. Tonawanda	35.6	30.0	14.9	12.3	118	109	.....	.....

Table 12 — *General summary for each city of the State: showing the number of births, stillbirths, deaths, and deaths under one year, during* 1917, *with corresponding birth and death rates for* 1917, *in comparison with* 1912–1916; *also infant mortality rates for* 1917 *and* 1916 — (Continued)

	CITY	Population (estimated) 1917	Total births (stillbirths excluded)	Still-births	Total deaths (stillbirths excluded)	Deaths under one year
51	Ogdensburg‡	†13,681	341	21	504	55
52	Olean	19,169	513	24	267	44
53	Oneonta	10,848	254	12	181	24
54	Peekskill, village	15,570	289	11	224	30
55	Port Chester, village	16,030	568	18	221	50
56	Rensselaer	11,419	127	2	124	11
57	Saratoga Springs	14,237	242	12	275	13
58	Watervliet	†14,946	316	10	246	47
59	IIIc Cities under 10,000	92,753	2,130	88	1,607	181
60	Beacon‡	†9,970	212	12	223	22
61	Canandaigua	7,605	199	8	162	7
62	Mechanicville	8,821	233	18	85	13
63	Norwich	8,696	160	9	158	21
64	Oneida	9,912	220	5	170	11
65	Ossining, village‡	†9,812	211	2	165	19
66	Plattsburg	†9,715	262	13	204	30
67	Port Jervis	†9,351	218	7	193	27
68	Salamanca	9,388	174	11	120	12
69	Tonawanda	9,483	205	3	119	17
70	City of Sherrill§	.....	36	.....	8	2

§ Special charter, with a population of about 1,400 in 1915

Table 12 — *General summary for each city of the State: showing the number of births, stillbirths, deaths, and deaths under one year, during* 1917, *with corresponding birth and death rates for* 1917, *in comparison with* 1912–1916; *also, infant mortality rates for* 1917 *and* 1916 — (Concluded)

	CITY	BIRTH RATES		DEATH RATES		INFANT MORTALITY RATES		AFTER EXCLUSION OF STATE INSTITUTIONS	
		1917	Annual average 1912–1916	1917	Annual average 1912–1916	1917	1916	Deaths 1917	Death rate
51	Ogdensburg‡...	23.8	24.9	35.2	29.6	161	134	314	21.9
52	Olean.....	26.8	26.1	13.9	13.3	86	72	.....	.....
53	Oneonta.....	23.4	20.4	16.7	16.2	94	97	.....	.....
54	Peekskill, village.....	18.6	20.5	14.4	15.0	104	81	.....	.....
55	Port Chester, village.....	35.4	34.9	13.8	13.6	88	65	.....	.....
56	Rensselaer.....	11.1	14.2	10.9	13.1	87	136	.....	.....
57	Saratoga Spgs..	17.0	17.6	19.3	22.1	54	121	.....	.....
58	Watervliet.....	21.1	17.4	16.4	15.3	149	94	.....	.....
59	IIIc Cities under 10-000.....	23.0	.....	17.3	.....	85	92	.....	.....
60	Beacon‡.....	20.9	22.7	21.9	19.2	104	87	178	17.5
61	Canandaigua...	26.2	24.5	21.3	23.2	35	68	.....	.....
62	Mechanicville..	26.4	30.5	9.6	11.7	56	52	.....	.....
63	Norwich.....	18.4	20.1	18.2	15.8	131	100	.....	.....
64	Oneida.....	22.2	21.0	17.2	16.2	50	95	.....	.....
65	Ossining, village‡.....	20.4	18.8	16.0	16.8	90	76	153	14.8
66	Plattsburg.....	25.9	23.0	20.1	19.3	115	162	.....	.....
67	Port Jervis....	23.2	17.0	20.5	18.8	124	117	.....	.....
68	Salamanca.....	18.5	21.8	12.8	13.5	69	92	.....	.....
69	Tonawanda....	21.6	19.5	12.5	11.4	83	76	.....	.....
70	City of Sherrill	....	.....	....	.....	.....	.....	.....	.....

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City*

CITIES	Estimated population * 1917	Total births (stillbirths excluded)	Stillbirths	Total deaths (stillbirths excluded)	Age in Years					
					Under 1	1 to 4	Total under 5	5 to 60	60 years and over	Unknown
1 State of New York	**10,490,680**	**246,453**	**9,971**	**154,127**	**22,473**	**8,955**	**31,428**	**68,191**	**54,438**	**70**
2 New York City	**5,737,492**	**141,564**	**6,115**	**78,575**	**12,565**	**5,697**	**18,262**	**39,234**	**21,079**	..
3 Rest of State	**4,753,188**	**104,889**	**3,856**	**75,552**	**9,908**	**3,258**	**13,166**	**28,957**	**33,359**	**70**
4 Rural	**2,434,039**	**43,967**	**1,512**	**36,605**	**3,751**	**1,164**	**4,915**	**12,214**	**19,421**	**55**
5 Cities	**2,319,149**	**60,922**	**2,344**	**38,947**	**6,157**	**2,094**	**8,251**	**16,743**	**13,938**	**15**
6 I Cities over 175,000	728,857	20,423	784	11,752	1,984	701	2,685	5,441	3,626	..
7 Buffalo‡	466,196	13,468	505	7,664	1,403	417	1,820	3,752	2,092	..
8 Rochester‡	262,661	6,955	279	4,088	581	284	865	1,689	1,534	..
9 II Cities 50,000–175,000	650,936	16,944	638	11,226	1,743	644	2,387	4,786	4,053	..
10 Albany	111,027	2,254	96	2,029	245	96	341	901	787	..
11 Binghamton‡	55,667	1,607	60	1,226	170	75	245	532	449	..
12 Schenectady	83,153	2,366	69	1,100	229	60	289	427	384	..
13 Syracuse‡	148,175	4,218	166	2,438	430	132	562	1,013	863	..
14 Troy	†74,949	1,428	68	1,654	201	95	296	718	640	..
15 Utica‡	82,873	2,561	103	1,577	259	85	344	633	600	..
16 Yonkers	95,092	2,510	76	1,202	209	101	310	562	330	..
17 IIIa Cities 20,000 to 50,000	497,264	12,518	501	8,049	1,200	381	1,581	3,383	3,078	7
18 Amsterdam	35,412	971	37	485	89	28	117	198	167	3
19 Auburn‡	†31,551	832	45	547	70	24	94	193	259	1
20 Cohoes	†22,911	571	9	435	85	22	107	186	141	1
21 Elmira‡	41,235	1,112	48	748	88	24	112	309	327	..
22 Gloversville	21,357	474	25	350	39	11	50	139	161	..
23 Jamestown	40,283	850	32	525	72	27	99	234	192	..
24 Kingston	26,524	480	21	520	45	18	63	240	216	1
25 Mount Vernon	40,146	902	34	419	50	22	72	170	176	1
26 Newburgh	27,879	576	26	539	54	17	71	240	228	..
27 New Rochelle	32,770	704	32	358	66	14	80	165	113	..
28 Niagara Falls	46,913	1,677	60	719	206	52	258	326	135	..
29 Oswego	26,232	553	25	367	49	14	63	129	175	..
30 Poughkeepsie	34,578	847	14	545	92	31	123	186	236	..
31 Rome‡	22,444	778	43	676	76	38	114	314	248	..
32 Watertown	26,936	718	28	558	86	27	113	227	218	..
33 White Plains	20,093	473	22	258	33	12	45	127	86	..
34 IIIb Cities 10,000 to 20,000	349,339	8,907	333	6,313	1,049	303	1,352	2,481	2,475	5
35 Batavia‡	13,920	341	17	244	38	5	43	103	98	..
36 Corning	†13,346	355	10	266	37	8	45	116	105	..
37 Cortland	12,707	293	14	273	32	6	38	108	126	1
38 Dunkirk	17,923	594	15	311	62	27	89	124	98	..
39 Fulton	11,373	308	14	161	27	6	33	56	72	..
40 Geneva	13,542	379	15	237	34	14	48	92	97	..
41 Glens Falls	16,745	298	23	279	28	13	41	114	123	1
42 Hornell	14,638	290	10	194	23	4	27	79	88	..
43 Hudson‡	11,576	331	9	231	37	8	45	81	105	..
44 Ithaca	17,524	353	13	273	18	2	20	100	153	..

* Estimate based on United States census of 1900 and 1910 for New York city, and on U. S. census of 1910 and State census of 1915 for remainder of State.

† Cities for which a decrease was shown in population from 1910 to 1915.

‡ Cities in which State institutions are located.

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City* — (Continued)

	Typhoid fever (1)	Smallpox (5)	Measles (6)	Scarlet fever (7)	Whooping cough (8)	Diphtheria (9)	Influenza (10)	Tuberculosis (all forms) (28–35)	Pulmonary tuberculosis (28, 29)
1 State of New York	**593**	**4**	**904**	**259**	**894**	**1,755**	**1,694**	**16,632**	**14,795**
2 New York City	**229**	.....	**560**	**120**	**489**	**1,158**	**657**	**10,142**	**9,120**
3 Rest of State	**364**	**4**	**344**	**139**	**405**	**597**	**1,037**	**6,490**	**5,675**
4 Rural	**152**	.....	**126**	**38**	**167**	**219**	**718**	**3,076**	**2,777**
5 Cities	**212**	**4**	**218**	**101**	**238**	**378**	**319**	**3,414**	**2,898**
6 I CITIES OVER 175,000	55	1	43	66	74	161	45	1,119	977
7 Buffalo	47	1	7	30	56	108	32	802	723
8 Rochester	8	.....	36	36	18	53	13	317	254
9 II CITIES 50,000–175,000	73	1	85	23	64	122	83	1,071	891
10 Albany	13	1	34	.....	2	10	18	238	212
11 Binghamton	7	.....	7	2	13	24	10	103	84
12 Schenectady	4	.....	8	1	5	6	13	77	64
13 Syracuse	10	.....	15	11	10	32	7	186	141
14 Troy	22	.....	14	2	16	16	25	208	182
15 Utica	11	.....	6	1	12	10	6	116	90
16 Yonkers	6	.....	1	6	6	24	4	143	118
17 IIIa CITIES 20,000–50,000	36	.....	27	4	45	51	62	716	615
18 Amsterdam	.....	.....	1	.....	.....	3	2	42	35
19 Auburn	2	.....	.....	.....	.....	8	3	36	35
20 Cohoes	3	.....	1	.....	5	2	3	43	36
21 Elmira	5	.....	.....	2	1	2	8	39	33
22 Gloversville	1	.....	.....	.....	3	6	3	17	14
23 Jamestown	2	.....	2	2	4	3	6	55	44
24 Kingston	3	.....	.....	.....	2	2	9	57	53
25 Mount Vernon	4	.....	3	.....	2	2	1	25	20
26 Newburgh	.....	.....	3	.....	.....	8	3	91	85
27 New Rochelle	1	.....	.....	.....	2	1	4	16	11
28 Niagara Falls	5	.....	4	.....	5	4	2	49	35
29 Oswego	1	.....	1	.....	1	2	5	28	25
30 Poughkeepsie	3	.....	.....	.....	4	3	1	34	29
31 Rome	3	.....	11	.....	.....	2	4	129	122
32 Watertown	3	.....	.....	.....	16	.....	8	34	25
33 White Plains	.....	.....	1	.....	.....	3	.....	21	13
34 IIIb CITIES 10,000–20,000	39	1	62	6	47	36	98	406	327
35 Batavia	1	.....	.....	.....	1	1	8	9	9
36 Corning	4	.....	.....	1	.....	3	4	17	15
37 Cortland	1	.....	.....	1	.....	.....	3	16	9
38 Dunkirk	1	.....	.....	.....	8	1	22	21	16
39 Fulton	.....	.....	.....	.....	.....	4	2	4	4
40 Geneva	2	.....	.....	1	.....	.....	3	9	4
41 Glens Falls	2	.....	.....	1	.....	4	4	21	15
42 Hornell	.....	.....	.....	1	2	3	3	10	10
43 Hudson	2	.....	.....	.....	.....	.....	2	13	11
44 Ithaca	3	.....	.....	.....	.....	.....	4	12	9

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City* — (Continued)

	Tuberculous meningitis (30)	Other forms of tuberculosis (31–35)	Cancer (39–45)	Diabetes (50)	Cerebrospinal meningitis (61b, c)	Acute anterior poliomyelitis (63a)	Apoplexy and cerebral hemorrhage (64)	Organic heart disease (79)	Arteriosclerosis (81)
1 State of New York	**1,077**	**760**	**9,736**	**2,281**	**314**	**92**	**6,796**	**21,688**	**4,825**
2 New York City	**680**	**342**	**4,867**	**1,153**	**185**	**53**	**794**	**11,102**	**2,903**
3 Rest of State	**397**	**418**	**4,869**	**1,128**	**129**	**39**	**6,002**	**10,586**	**1,922**
4 Rural	**123**	**176**	**2,338**	**545**	**40**	**23**	**3,307**	**5,697**	**1,144**
5 Cities	**274**	**242**	**2,531**	**583**	**89**	**16**	**2,695**	**4,889**	**778**
6 I CITIES OVER 175,000	85	57	777	205	29	1	779	1,393	216
7 Buffalo	55	24	463	126	19	1	476	814	136
8 Rochester	30	33	314	79	10	.....	303	579	80
9 II CITIES 50,000–175,000	97	83	739	149	27	4	751	1,452	233
10 Albany	11	15	159	32	7	2	139	273	65
11 Binghamton	9	10	69	10	2	1	74	157	28
12 Schenectady	8	5	78	11	4	.....	94	111	28
13 Syracuse	25	20	165	38	1	1	176	321	30
14 Troy	14	12	114	23	10	.....	86	228	36
15 Utica	12	14	95	21	3	.....	100	238	33
16 Yonkers	18	7	59	14	.....	.....	82	124	13
17 IIIa CITIES 20,000–50,000	41	60	513	126	20	7	594	1,024	168
18 Amsterdam	3	4	27	3	1	.....	30	70	11
19 Auburn	.....	1	50	11	.....	.....	59	89	3
20 Cohoes	3	4	27	10	4	.....	25	51	10
21 Elmira	2	4	53	18	1	.....	46	97	17
22 Gloversville	1	2	26	7	1	1	35	57	6
23 Jamestown	7	4	48	6	1	1	46	55	16
24 Kingston	1	3	28	4	.....	.....	49	74	14
25 Mount Vernon	2	3	27	9	1	1	31	54	5
26 Newburgh	2	4	35	2	1	.....	38	62	7
27 New Rochelle	3	2	24	5	.....	.....	25	39	4
28 Niagara Falls	7	7	28	6	5	.....	21	64	9
29 Oswego	1	2	30	6	.....	.....	39	65	9
30 Poughkeepsie	3	2	28	14	1	1	56	68	26
31 Rome	.....	7	27	11	.....	1	41	86	13
32 Watertown	4	5	33	10	2	1	34	60	17
33 White Plains	2	6	22	4	2	1	19	33	1
34 IIIb CITIES 10,000–20,000	42	37	398	77	13	3	442	792	137
35 Batavia	.....	.....	10	2	1	.....	12	31	5
36 Corning	1	1	13	2	1	.....	19	24	8
37 Cortland	4	3	17	3	1	.....	28	27	2
38 Dunkirk	3	2	10	3	.....	.....	16	33	4
39 Fulton	.....	.....	22	4	.....	.....	12	25	3
40 Geneva	1	4	17	2	1	.....	23	37	7
41 Glens Falls	3	3	22	3	.....	.....	26	46	5
42 Hornell	.....	.....	17	3	.....	.....	14	31	2
43 Hudson	2	.....	14	8	.....	1	12	25	9
44 Ithaca	1	2	29	3	.....	.....	29	30	10

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City* — (Continued)

	Bronchitis (89, 90)	Pneumonia (all forms) (91, 92)	Bronchopneumonia (91)	Lobar pneumonia and unqualified (92)	Diarrhea and enteritis (under 2 years) (104)	Appendicitis (108)	Hernia, intestinal obstruction (109)	Cirrhosis of liver (113)	Nephritis and Bright's disease (119, 120)
1 State of New York	**1,850**	**18,673**	**6,604**	**12,069**	**5,624**	**1,191**	**1,285**	**1,319**	**13,136**
2 New York City	**924**	**11,051**	**3,783**	**7,268**	**3,181**	**668**	**601**	**668**	**6,727**
3 Rest of State	**926**	**7,622**	**2,821**	**4,801**	**2,443**	**523**	**684**	**651**	**6,409**
4 Rural	**522**	**3,447**	**1,304**	**2,143**	**718**	**127**	**271**	**307**	**3,066**
5 Cities	**404**	**4,175**	**1,517**	**2,658**	**1,725**	**396**	**413**	**344**	**3,343**
6 I CITIES OVER 175,000	112	1,276	494	782	659	139	97	123	1,041
7 Buffalo	74	865	320	545	474	94	67	76	651
8 Rochester	38	411	174	237	185	45	30	47	390
9 II CITIES 50,000–175,000	115	1,268	449	819	457	104	122	98	952
10 Albany	19	189	63	126	44	17	20	21	162
11 Binghamton	14	150	45	105	50	7	11	8	95
12 Schenectady	6	105	42	63	78	9	7	12	77
13 Syracuse	26	250	77	173	129	23	31	14	194
14 Troy	14	209	96	113	32	14	18	15	163
15 Utica	24	202	88	114	50	21	22	13	155
16 Yonkers	12	163	38	125	74	13	13	15	106
17 IIIa CITIES 20,000–50,000	84	803	295	508	327	86	96	70	703
18 Amsterdam	4	54	25	29	31	8	4	5	29
19 Auburn	4	55	15	40	22	3	6	4	36
20 Cohoes	2	57	25	32	27	3	6	4	35
21 Elmira	6	77	32	45	16	9	15	4	97
22 Gloversville	4	25	9	16	6	5	7	3	35
23 Jamestown	6	36	10	26	6	3	12	5	29
24 Kingston	6	39	12	27	7	12	6	1	47
25 Mount Vernon	7	40	12	28	12	5	6	6	55
26 Newburgh	3	49	11	38	12	2	9	3	65
27 New Rochelle	4	41	15	26	14	6	2	5	29
28 Niagara Falls	2	91	38	53	87	6	7	9	53
29 Oswego	3	22	8	14	17	1	7	4	38
30 Poughkeepsie	7	82	32	50	17	3	2	5	29
31 Rome	16	54	28	26	25	3	5	3	74
32 Watertown	9	55	14	41	21	10	2	6	35
33 White Plains	1	26	9	17	7	7	.....	3	17
34 IIIb CITIES 10,000–20,000	74	658	228	430	240	47	83	42	510
35 Batavia	1	19	5	14	8	1	4	2	19
36 Corning	2	32	5	27	9	3	6	1	34
37 Cortland	1	25	2	23	7	4	5	1	32
38 Dunkirk	5	28	13	15	10	1	5	2	16
39 Fulton	.....	19	6	13	6	1	2	3	9
40 Geneva	2	30	8	22	7	2	3	.....	11
41 Glens Falls	1	20	7	13	5	6	5	1	20
42 Hornell	2	20	11	9	5	1	3	3	7
43 Hudson	12	30	8	22	8	.....	6	.....	17
44 Ithaca	.....	28	6	22	1	2	2	2	36

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City* — (Continued)

	Puerperal septicemia (137)	Other puerperal affections (134–136, 138–141)	Total diseases peculiar to early infancy (150–153)	Congenital malformations (150)	Premature birth (151a)	Congenital debility (151b)	Other causes peculiar to early infancy (152–153)	Old age (154)
1 State of New York	**469**	**864**	**9,745**	**1,472**	**4,736**	**1,576**	**1,961**	**885**
2 New York City	**213**	**438**	**5,212**	**698**	**2,433**	**954**	**1,127**	**271**
3 Rest of State	**256**	**426**	**4,533**	**774**	**2,303**	**622**	**834**	**614**
4 Rural	**93**	**163**	**1,838**	**344**	**869**	**288**	**337**	**434**
5 Cities	**163**	**263**	**2,695**	**430**	**1,434**	**334**	**497**	**180**
6 I CITIES OVER 175,000	43	61	788	122	466	51	149	19
7 Buffalo	26	40	528	88	307	40	93	18
8 Rochester	17	21	260	34	159	11	56	1
9 II CITIES 50,000–175,000	54	71	766	127	360	129	150	42
10 Albany	8	14	125	25	59	19	22	8
11 Binghamton	6	4	85	15	36	15	19	2
12 Schenectady	5	7	111	15	57	11	28	2
13 Syracuse	13	19	175	26	92	30	27	17
14 Troy	9	11	84	15	32	28	9	7
15 Utica	6	7	100	20	40	14	26	3
16 Yonkers	7	9	86	11	44	12	19	3
17 IIIa CITIES 20,000–50,000	36	63	563	77	319	69	98	63
18 Amsterdam	4	6	38	5	19	3	11	5
19 Auburn	.....	6	34	5	19	8	2	12
20 Cohoes	.....	5	31	4	19	2	6	1
21 Elmira	4	9	52	8	27	7	10	4
22 Gloversville	.....	3	22	7	13	1	1	1
23 Jamestown	3	6	44	4	23	7	10	2
24 Kingston	1	2	26	5	17	3	1	8
25 Mount Vernon	3	.....	26	4	13	4	5	1
26 Newburgh	3	2	31	2	18	5	6	1
27 New Rochelle	1	.....	41	4	21	4	12	7
28 Niagara Falls	6	4	71	8	47	9	7	5
29 Oswego	3	1	29	4	15	2	8	7
30 Poughkeepsie	1	5	39	4	25	2	8	.....
31 Rome	1	5	22	4	10	5	3	3
32 Watertown	5	9	40	8	26	4	2	5
33 White Plains	1	.....	17	1	7	3	6	1
34 IIIb CITIES 10,000–20,000	24	53	481	93	231	74	83	45
35 Batavia	1	2	22	4	13	3	2	3
36 Corning	1	3	20	1	11	3	5	2
37 Cortland	.....	5	15	2	9	3	1	5
38 Dunkirk	.....	2	32	9	16	.....	7	2
39 Fulton	.....	2	15	2	8	.....	5	1
40 Geneva	4	1	17	2	7	1	7	4
41 Glens Falls	1	1	19	4	11	2	2	5
42 Hornell	1	.....	8	1	3	1	3	2
43 Hudson	1	1	21	5	8	2	6	1
44 Ithaca	1	1	12	1	6	2	3	5

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City* — (Continued)

	Total accidents (164–181, 185, 186)	Railroad accidents (175a)	Automobile accidents (175c)	Drowning (169)	Other accidents	Suicides (153–163)	Homicides (182–184)	All other causes
1 State of New York	**9,274**	**831**	**1,066**	**994**	**6,383**	**1,441**	**426**	**19,478**
2 New York City	**4,716**	**98**	**518**	**504**	**3,596**	**778**	**248**	**8,467**
3 Rest of State	**4,558**	**733**	**548**	**490**	**2,787**	**663**	**178**	**11,011**
4 Rural	**2,148**	**399**	**217**	**316**	**1,216**	**337**	**66**	**5,478**
5 Cities	**2,410**	**334**	**331**	**174**	**1,571**	**326**	**112**	**5,533**
6 I CITIES OVER 175,000	705	82	106	31	486	87	46	1,592
7 Buffalo	509	62	80	23	344	53	36	1,035
8 Rochester	196	20	26	8	142	34	10	557
9 II CITIES 50,000–175,000	646	84	89	59	414	95	27	1,532
10 Albany	111	12	20	11	68	15	5	278
11 Binghamton	57	6	5	4	42	9	2	219
12 Schenectady	66	11	15	5	35	13	5	157
13 Syracuse	176	25	19	21	111	24	5	339
14 Troy	73	8	8	6	51	8	5	192
15 Utica	102	19	12	7	64	13	1	206
16 Yonkers	61	3	10	5	43	13	4	141
17 IIIa CITIES 20,000–50,000	499	61	61	40	337	77	25	1,161
18 Amsterdam	32	4	2	5	21	1	1	73
19 Auburn	26	3	1	1	21	6	.....	72
20 Cohoes	31	5	1	8	17	1	1	47
21 Elmira	55	14	7	1	33	6	1	104
22 Gloversville	17	.....	2	1	14	3	2	54
23 Jamestown	30	4	3	1	22	5	4	87
24 Kingston	34	3	2	2	27	5	1	83
25 Mount Vernon	17	.....	5	.....	12	6	.....	70
26 Newburgh	35	3	3	2	27	6	3	65
27 New Rochelle	28	.....	7	3	18	5	3	51
28 Niagara Falls	71	11	10	6	44	5	4	96
29 Oswego	12	2	2	1	7	.....	.....	36
30 Poughkeepsie	21	2	3	1	15	4	.....	91
31 Rome	31	3	3	6	19	7	1	98
32 Watertown	37	5	6	2	24	7	3	96
33 White Plains	22	2	4	.....	16	10	1	38
34 IIIb CITIES 10,000–20,000	446	77	61	38	270	54	14	985
35 Batavia	17	6	.....	.....	11	3	2	59
36 Corning	20	9	3	2	6	2	.....	35
37 Cortland	16	2	3	1	10	4	.....	54
38 Dunkirk	35	8	8	1	18	.....	1	53
39 Fulton	12	1	2	3	6	.....	.....	15
40 Geneva	18	4	5	.....	9	2	1	33
41 Glens Falls	16	1	3	.....	12	3	.....	42
42 Hornell	17	6	1	1	9	1	.....	38
43 Hudson	12	2	.....	2	8	4	.....	32
44 Ithaca	16	.....	3	1	12	4	.....	43

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City* — (Continued)

CITIES	Estimated population, 1917*	Total births (stillbirths excluded)	Stillbirths	Total deaths (stillbirths excluded)	Age in Years					
					Under 1	1 to 4	Total under 5	5 to 59	60 years and over	Unknown
45 Johnstown	10,771	201	7	141	17	4	21	46	74	..
46 Lackawanna	16,212	926	26	448	260	88	348	89	10	1
47 Little Falls	13,300	417	13	230	42	12	54	102	73	1
48 Lockport	18,973	388	20	331	36	16	52	126	153	..
49 Middletown‡	16,815	282	11	442	25	9	34	207	201	..
50 North Tonawanda	14,084	501	6	210	59	11	70	89	51	..
51 Ogdensburg‡	†13,681	341	21	504	55	13	68	210	226	..
52 Olean	19,169	513	24	267	44	15	59	113	95	..
53 Oneonta	10,848	254	12	181	24	1	25	72	84	..
54 Peekskill, village	15,570	289	11	224	30	3	33	103	88	..
55 Port Chester, village	16,030	568	18	221	50	18	68	98	55	..
56 Rensselaer	11,409	127	2	124	11	3	14	47	62	1
57 Saratoga Springs	14,237	242	12	275	13	6	19	113	143	..
58 Watervliet	†14,946	316	10	246	47	11	58	93	95	..
59 IIIc Cities under 10,000	92,753	2,130	88	1,607	181	65	246	652	706	3
60 Beacon‡	†9,970	212	12	223	22	8	30	99	93	1
61 Canandaigua	7,605	199	8	162	7	4	11	58	93	..
62 Mechanicville	8,821	233	18	85	13	5	18	37	29	1
63 Norwich	8,696	160	9	158	21	2	23	52	83	..
64 Oneida	9,912	220	5	170	11	5	16	59	95	..
65 Ossining, village‡	†9,812	211	2	165	19	9	28	70	66	1
66 Plattsburg	†9,715	262	13	204	30	9	39	89	76	..
67 Port Jervis	†9,351	218	7	193	27	7	34	82	77	..
68 Salamanca	9,388	174	11	120	12	8	20	57	43	..
69 Tonawanda	9,483	205	3	119	17	8	25	47	47	..
70 City of Sherrill§	.....	36	.....	8	2	.....	2	2	4	..

* Estimate based on United States censuses of 1900 and 1910 for New York city, and on U. S. census of 1910 and State census of 1915 for remainder of State.

† Certain cities for which a decrease was shown in population from 1910 to 1915.

‡ Cities in which State institutions are located.

§ Special charter with a population of about 1,400 in 1915.

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City* — (Continued)

	Typhoid fever (1)	Smallpox (5)	Measles (6)	Scarlet fever (7)	Whooping cough (8)	Diphtheria (9)	Influenza (10)	Tuberculosis (all forms) (28–35)	Pulmonary tuberculosis (28–29)
45 Johnstown	.....	.....	.....	.....	1	.....	3	9	4
46 Lackawanna	.....	.....	53	.....	21	3	3	26	21
47 Little Falls	4	.....	1	.....	1	1	6	12	8
48 Lockport	6	.....	1	.....	.....	2	3	30	27
49 Middletown	1	.....	2	.....	1	2	5	48	42
50 North Tonawanda	2	.....	.....	.....	4	.....	.....	17	15
51 Ogdensburg	5	.....	4	.....	.....	2	4	33	27
52 Olean	1	.....	.....	.....	2	4	3	5	4
53 Oneonta	1	.....	1	.....	1	.....	.....	8	6
54 Peekskill, village	.....	.....	.....	.....	1	.....	5	26	19
55 Port Chester, village	.....	.....	.....	.....	4	2	3	18	13
56 Rensselaer	1	.....	.....	1	.....	1	2	10	10
57 Saratoga Springs	1	.....	.....	.....	.....	.....	4	14	11
58 Watervliet	1	1	.....	.....	.....	3	2	18	18
59 IIIc CITIES UNDER 10,000	9	1	1	2	8	8	31	102	88
60 Beacon	.....	.....	1	.....	5	.....	4	22	19
61 Canandaigua	1	.....	.....	.....	.....	.....	4	7	7
62 Mechanicville	4	.....	.....	.....	.....	1	1	6	6
63 Norwich	.....	.....	.....	.....	.....	.....	3	10	8
64 Oneida	.....	.....	.....	.....	.....	2	2	7	5
65 Ossining, village	.....	.....	.....	1	.....	2	2	16	12
66 Plattsburg	4	1	.....	1	2	1	1	14	12
67 Port Jervis	.....	.....	.....	.....	1	.....	9	7	7
68 Salamanca	.....	.....	.....	.....	.....	1	2	7	6
69 Tonawanda	.....	.....	.....	.....	.....	1	3	6	6
70 City of Sherrill	.....	.....	.....	.....	.....	.....	.....	.....	.....

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City* — (Continued)

	Tuberculous meningitis (30)	Other forms of tuberculosis (31–35)	Cancer (39–45)	Diabetes (50)	Cerebrospinal meningitis (61b, c)	Acute anterior poliomyelitis (63a)	Apoplexy and cerebral hemorrhage (64)	Organic heart disease (79)	Arteriosclerosis (81)
45 Johnstown	2	3	13	6	.....	.....	12	21	6
46 Lackawanna	5	.....	1	.....	2	.....	4	4	2
47 Little Falls	3	1	12	1	.....	.....	16	24	1
48 Lockport	1	2	25	2	.....	.....	33	59	9
49 Middletown	3	3	26	3	1	1	32	67	10
50 North Tonawanda	1	1	14	6	1	.....	9	15	1
51 Ogdensburg	3	3	23	9	1	.....	38	111	19
52 Olean	.....	1	19	5	2	.....	14	26	5
53 Oneonta	2	.....	14	2	1	.....	15	24	4
54 Peekskill, village	3	4	21	3	.....	.....	14	29	4
55 Port Chester, village	3	2	8	1	.....	1	12	15	4
56 Rensselaer	.....	.....	6	1	.....	.....	11	21	6
57 Saratoga Springs	1	2	27	2	.....	.....	20	32	11
58 Watervliet	.....	.....	18	3	1	.....	21	35	.....
59 IIIc CITIES UNDER 10,000	9	5	104	26	.....	1	129	228	24
60 Beacon	3	.....	16	2	.....	.....	19	17	5
61 Canandaigua	.....	.....	10	2	.....	.....	21	27	3
62 Mechanicville	.....	.....	3	.....	.....	.....	4	14	1
63 Norwich	2	.....	9	5	.....	.....	12	26	2
64 Oneida	1	1	13	3	.....	.....	17	38	4
65 Ossining, village	3	1	6	4	.....	.....	21	13	2
66 Plattsburg	.....	2	11	3	.....	1	9	25	1
67 Port Jervis	.....	.....	12	5	.....	.....	13	29	2
68 Salamanca	.....	1	8	1	.....	.....	4	19	.....
69 Tonawanda	.....	.....	16	1	.....	.....	9	18	4
70 City of Sherrill	.....	.....	.....	.....	.....	.....	.....	2	.....

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City*— (Continued)

	Bronchitis (89, 90)	Pneumonia (all forms) (91, 92)	Bronchopneumonia (91)	Lobar pneumonia and unqualified (92)	Diarrhea and enteritis (under 2 years) (104)	Appendicitis (108)	Hernia, intestinal obstruction (109)	Cirrhosis of liver (113)	Nephritis and Bright's disease (119, 120)
45 Johnstown	2	7	2	5	2	.....	.....	.....	23
46 Lackawanna	7	40	18	22	80	2	1	1	6
47 Little Falls	1	17	6	11	15	3	3	3	25
48 Lockport	2	36	8	28	9	.....	3	7	23
49 Middletown	2	56	20	36	3	2	8	3	48
50 North Tonawanda	8	20	9	11	16	4	2	1	9
51 Ogdensburg	3	45	22	23	8	5	5	3	28
52 Olean	1	35	9	26	4	5	6	1	22
53 Oneonta	3	9	2	7	4	2	1	.....	15
54 Peekskill, village	4	22	9	13	11	1	1	1	19
55 Port Chester, village	5	36	16	20	8	1	7	5	20
56 Rensselaer	6	12	4	8	2	1	2	.....	11
57 Saratoga Springs	1	32	12	20	2	.....	3	1	45
58 Watervliet	3	40	20	20	10	.....	.....	1	15
59 IIIa CITIES UNDER 10,000	19	170	51	119	42	20	15	11	137
60 Beacon	2	28	8	20	3	1	1	.....	27
61 Canandaigua	2	9	2	7	.....	5	3	1	15
62 Mechanicville	3	14	7	7	2	.....	.....	.....	4
63 Norwich	2	17	3	14	4	.....	.....	1	16
64 Oneida	1	19	4	15	5	2	2	1	7
65 Ossining, village	.....	18	9	9	3	3	1	.....	21
66 Plattsburg	2	14	2	12	4	5	3	.....	15
67 Port Jervis	4	21	5	16	9	3	4	4	16
68 Salamanca	3	16	6	10	5	1	1	3	7
69 Tonawanda	.....	11	5	6	6	.....	.....	1	9
70 City of Sherrill	.....	3	.....	3	1	.....	.....	.....	.....

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City* — (Continued)

	Puerperal septicemia (137)	Other puerperal affections (134–136, 138–141)	Total diseases peculiar to early infancy (150–153)	Congenital malformations (150)	Premature birth (151a)	Congenital debility (151b)	Other causes peculiar to early infancy (152–153)	Old age (154)
45 Johnstown	1	.....	11	2	4	3	2	.....
46 Lackawanna	1	.....	68	10	23	24	11	.....
47 Little Falls	2	4	17	6	9	.....	2	4
48 Lockport	.....	2	20	4	6	8	2	2
49 Middletown	.....	4	14	3	7	1	3	1
50 North Tonawanda	2	1	24	6	11	5	2	1
51 Ogdensburg	3	2	33	16	12	2	3	1
52 Olean	3	7	27	3	17	5	2	.....
53 Oneonta	2	5	14	3	10	1	.....	.....
54 Peekskill, village	.....	1	10	2	6	.....	2	.....
55 Port Chester, village	.....	4	19	4	11	2	2	1
56 Rensselaer	.....	.....	5	.....	1	.....	4	1
57 Saratoga Springs	.....	3	9	1	5	.....	3	.....
58 Watervliet	.....	2	29	2	17	6	4	4
59 IIIc CITIES UNDER 10,000	6	15	97	11	58	11	17	11
60 Beacon	1	2	10	2	7	.....	1	.....
61 Canandaigua	1	1	5	1	4	.....	.....	1
62 Mechanicville	.....	3	7	.....	2	1	4	.....
63 Norwich	2	.....	17	2	12	2	1	.....
64 Oneida	.....	1	4	.....	3	.....	1	4
65 Ossining, village	1	2	9	1	5	2	1	.....
66 Plattsburg	1	3	18	3	8	4	3	1
67 Port Jervis	.....	1	13	1	8	1	3	3
68 Salamanca	.....	2	4	.....	2	.....	2	2
69 Tonawanda	.....	.....	9	1	7	1	.....	.....
70 City of Sherrill	.....	.....	1	.....	.....	.....	1	.....

Table 13 — *Deaths in each city of the State during* 1917, *classified by broad age periods and important causes; also by groups of cities and for total rural and cities, outside New York City* —(Concluded)

	Total accidents (164–181, 185, 186)	Railroad accidents (175a)	Automobile accidents (175c)	Drowning (169)	Other accidents	Suicides (155–163)	Homicides (182–184)	All other causes
45 Johnstown	5	.....	1	.....	4	1	.....	18
46 Lackawanna	40	10	3	.....	27	2	1	80
47 Little Falls	30	6	4	2	18	.....	1	26
48 Lockport	14	.....	2	1	11	3	.....	40
49 Middletown	19	4	1	.....	14	4	.....	79
50 North Tonawanda	22	1	1	5	15	3	3	25
51 Ogdensburg	18	1	3	2	12	5	.....	96
52 Olean	23	1	5	1	16	3	1	43
53 Oneonta	22	12	3	2	5	2	.....	31
54 Peekskill, village	18	1	3	5	9	1	.....	32
55 Port Chester, village	17	.....	3	2	12	2	1	27
56 Rensselaer	9	1	1	2	5	.....	.....	15
57 Saratoga Springs	20	1	2	3	14	4	.....	44
58 Watervliet	10	.....	1	2	7	1	3	25
59 IIIc CITIES UNDER 10,000	114	30	14	6	64	13	.....	263
60 Beacon	13	3	3	1	6	1	.....	43
61 Canandaigua	10	3	1	.....	6	2	.....	32
62 Mechanicville	5	1	.....	.....	4	.....	.....	13
63 Norwich	5	1	.....	.....	4	2	.....	25
64 Oneida	7	2	2	.....	3	.....	.....	31
65 Ossining, village	17	1	3	1	12	.....	.....	23
66 Plattsburg	21	5	2	.....	14	2	.....	41
67 Port Jervis	13	6	3	.....	4	2	.....	22
68 Salamanca	18	7	.....	1	10	2	.....	14
69 Tonawanda	5	1	.....	3	1	2	.....	18
70 City of Sherrill	.....	.....	.....	.....	.....	.....	.....	1

Table 14 — *Number of deaths from typhoid fever in each city of the State, with annual death rates per* 100,000 *population:* **1913–1917**

(Cities listed in order of death rates, from highest to lowest, 1917)

	Estimated population 1917	1917		1916		1915		1914		1913	
		Total deaths	Rate	Total deaths	Rate	Total deaths	Rate	Total deaths	Rate	Total deaths	Rate
State of New York	**10,490,680**	**593**	**5.7**	**603**	**5.9**	**775**	**7.7**	**878**	**8.9**	**1,018**	**10.5**
New York City	**5,737,492**	**229**	**4.0**	**215**	**3.8**	**333**	**6.1**	**334**	**6.3**	**362**	**7.0**
Rest of State	**4,753,188**	**364**	**7.7**	**388**	**8.3**	**442**	**9.5**	**544**	**11.9**	**656**	**14.5**
Cities	**2,319,149**	**212**	**9.1**	**239**	**10.5**	**254**	**11.3**	**317**	**14.3**	**381**	**17.4**
Rural	**2,434,039**	**152**	**6.2**	**149**	**6.2**	**188**	**7.9**	**227**	**9.6**	**275**	**11.8**
Mechanicville	8,821	4	45.3	1	11.7	1	12.2	1	12.7	1	13.2
Plattsburg	9,715	4	39.5	2	20.2	3	29.6	1	9.7	6	56.9
Ogdensburg	13,681	5	34.9	.....	.....	1	7.0	4	27.3	3	20.0
Lockport	18,973	6	31.6	5	26.5	1	5.3	2	10.8	13	70.6
Little Falls	13,300	4	30.1	1	7.6	1	7.7	1	7.8	5	39.2
Corning	13,346	4	29.7	5	37.3	1	7.4	4	29.6	2	14.7
Troy	74,949	22	29.1	15	19.9	17	22.5	26	34.3	14	18.4
Hudson	11,576	2	17.3	2	17.3	4	34.7	4	34.7	7	60.8
Ithaca	17,524	3	17.1	1	5.8	5	29.9	5	30.6	2	12.5
Geneva	13,542	2	14.8	1	7.5	2	15.1	4	30.6	5	38.7
North Tonawanda	14,084	2	14.2	5	36.3	4	29.6	8	60.6	2	15.5
Rome	22,444	3	13.4	3	13.5	2	9.1	5	23.1	5	23.4
Utica	82,873	11	13.3	9	11.0	3	3.7	6	7.6	8	10.2
Canandaigua	7,605	1	13.1	3	39.7	2	26.7	.....	.....	1	13.5
Cohoes	22,911	3	12.8	3	12.9	4	17.1	5	21.1	8	33.4
Binghamton	55,667	7	12.6	6	11.0	5	9.3	7	13.5	8	15.5
Elmira	41,235	5	12.1	4	9.8	5	12.5	5	12.7	4	10.3
Glens Falls	16,745	2	11.9	3	18.1	2	12.3	5	31.0	3	18.9
Albany	111,027	13	11.7	9	8.2	14	13.0	17	16.0	28	26.7
Kingston	26,524	3	11.3	6	22.7	3	11.4	2	7.6	10	38.2
Watertown	26,936	3	11.1	6	22.3	6	22.3	3	11.2	3	11.2
Niagara Falls	46,913	5	10.7	5	11.2	.....	.....	5	12.5	10	26.6
Buffalo	466,196	47	10.1	50	10.9	47	10.3	73	16.3	68	15.3
Mount Vernon	40,146	4	10.0	2	5.1	2	5.3	.....	.....	3	8.6
Oneonta	10,848	1	9.2	3	28.1	4	38.2	2	19.4	.....	.....
Rensselaer	11,409	1	8.8	1	8.8	2	17.8	.....	.....	.....	.....
Poughkeepsie	34,578	3	8.7	2	5.9	8	24.5	1	3.1	3	9.7
Cortland	12,707	1	7.9	1	8.0	1	8.1	1	8.2	2	16.6
Batavia	13,920	1	7.2	4	29.4	.....	.....	.....	.....	2	15.8
Saratoga Springs	14,237	1	7.0	3	21.4	3	21.8	4	29.0	5	36.4
Syracuse	148,175	10	6.7	19	12.9	9	6.2	15	10.4	19	13.0
Watervliet	14,946	1	6.7	5	33.4	6	40.0	5	33.3	11	73.2
Yonkers	95,092	6	6.3	2	2.2	8	8.8	4	4.5	11	12.7
Auburn	31,551	2	6.2	5	15.6	9	27.7	4	12.1	5	15.0
Middletown	16,815	1	5.9	2	12.0	2	12.2	1	6.2	6	37.6
Dunkirk	17,923	1	5.6	2	11.2	3	16.8	8	45.1	13	73.7
Olean	19,169	1	5.2	.....	.....	2	11.2	1	5.8	4	24.0
Jamestown	40,283	2	5.0	3	7.7	2	5.3	3	8.2	3	8.5
Schenectady	83,153	4	4.8	5	6.1	11	13.7	9	11.4	5	6.4
Gloversville	21,357	1	4.7	1	4.7	.....	.....	4	19.0	2	9.5
Oswego	26,232	1	3.8	3	11.6	4	15.7	6	24.0	4	16.2
New Rochelle	32,770	1	3.1	.....	.....	5	15.7	.....	.....	1	3.3
Rochester	262,661	8	3.0	13	5.1	15	6.0	26	10.7	23	9.7
Amsterdam	35,412	.....	.....	3	8.6	4	11.7	5	14.8	3	9.0
Beacon	9,970	.....	.....	1	9.9	1	9.8	1	9.7	1	9.7

Table 14 — *Number of deaths from typhoid fever in each city of the State, with annual death rates per* 100,000 *population:* **1913–1917** — (Concluded)

(Cities listed in order of death rates, from highest to lowest, 1917)

	Estimated population 1917	1917		1916		1915		1914		1913	
		Total deaths	Rate	Total deaths	Rate	Total deaths	Rate	Total deaths	Rate	Total deaths	Rate
Fulton	11,373	.....	.....	2	17.8	3	26.9	.....	.....	5	45.8
Hornell	14,638	.....	.....	1	6.9	1	7.0	1	7.0	3	21.3
Johnstown	10,771	.....	.....	.....	.....	1	9.4	1	9.4	3	28.3
Lackawanna	16,212	.....	.....	1	6.3	1	6.4	1	6.5	.....	.....
Newburgh	27,879	.....	.....	1	3.6	6	21.5	7	25.1	8	28.7
Norwich	8,696	.....	.....	.....	.....	.....	.....	1	12.2	3	37.6
Oneida	9,912	.....	.....	1	10.3	.....	.....	.....	.....	1	11.1
Ossining, village	9,812	.....	.....	1	9.9	.....	.....	1	9.4	5	42.2
Peekskill, village	15,570	.....	.....	3	19.3	2	12.9	2	12.9	1	6.5
Port Chester, village	16,030	.....	.....	.....	.....	2	13.2	2	13.8	1	6.7
Port Jervis	9,351	.....	.....	.....	.....	2	21.2	1	10.6	2	21.1
Salamanca	9,388	.....	.....	2	22.5	.....	.....	.....	.....	2	27.2
City of Sherrill	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tonawanda	9,483	.....	.....	2	21.5	.....	.....	4	44.5	3	34.0
White Plains	20,093	.....	.....	.....	.....	2	10.4	3	15.9	2	10.8

Table 15 — *Number of deaths from pulmonary tuberculosis in each city of the State, with annual death rates per* 100,000 *population:* **1913–1917**

(Cities listed in order of death rates, highest to lowest, for 1917)

	Estimated population 1917	1917		1916		1915		1914		1913	
		Total deaths	Rate	Total deaths	Rate	Total deaths	Rate	Total deaths	Rate	Total deaths	Rate
State of New York	**10,490,680**	**14,795**	**141.0**	**14,069**	**136.6**	**14,512**	**143.6**	**14,586**	**147.1**	**14,096**	**144.9**
New York City	**5,737,492**	**9,120**	**159.0**	**8,663**	**154.6**	**9,108**	**166.6**	**9,138**	**171.3**	**8,842**	**170.1**
Rest of State	**4,753,188**	**5,675**	**119.4**	**5,406**	**115.1**	**5,404**	**116.5**	**5,448**	**118.8**	**5,254**	**116.1**
Cities	**2,319,149**	**2,898**	**125.0**	**2,807**	**122.8**	**2,807**	**124.7**	**2,801**	**125.2**	**2,636**	**120.5**
Rural	**2,434,039**	**2,777**	**114.1**	**2,599**	**107.8**	**2,597**	**108.7**	**2,647**	**111.9**	**2,618**	**111.9**
Rome*	22,444	122	543.6	108	486.8	104	474.3	95	438.5	66	308.3
Newburgh*	27,879	85	304.9	71	254.7	68	243.1	57	204.5	68	241.0
Middletown*	16,815	42	249.8	43	259.1	44	268.6	37	228.9	37	232.0
Troy*	74,949	182	241.1	163	216.7	168	222.6	171	225.7	163	214.4
Kingston*	26,524	53	199.8	51	192.9	49	185.9	46	175.1	50	191.0
Albany*	111,027	212	190.9	221	201.8	271	251.0	248	233.0	223	212.5
Ogdensburg*	13,681	27	188.3	24	171.3	23	160.4	34	231.8	31	206.7
Beacon*	9,970	19	186.9	21	208.6	32	314.8	32	311.8	13	125.5
Buffalo*	466,196	723	155.1	673	146.2	634	139.5	649	144.6	566	127.7
Cohoes	22,911	36	153.6	41	176.9	48	204.8	35	147.7	33	137.8
Binghamton*	55,667	84	150.9	77	140.9	65	121.1	66	125.3	86	166.4
Lockport	18,973	27	142.3	13	69.0	16	85.6	22	118.6	9	48.9
Lackawanna	16,212	21	129.5	11	68.9	14	89.0	5	32.3	17	111.4
Yonkers	95,092	118	124.1	108	116.1	88	96.8	106	119.3	128	147.5
Peekskill, village	15,570	19	122.0	15	96.5	23	148.4	17	109.9	13	84.2
Watervliet	14,946	18	120.1	15	100.2	18	120.1	26	173.2	22	146.3
Plattsburg	9,715	12	118.4	8	80.6	17	167.8	11	106.3	19	180.0
Ossining, village*	9,812	12	116.2	12	119.2	17	164.6	18	170.1	15	126.7
Corning	13,346	15	111.4	19	141.8	11	81.7	8	59.2	3	22.1
Jamestown	40,283	44	109.2	30	76.9	24	63.5	26	71.2	27	76.5
Utica*	82,873	90	108.6	84	102.8	121	150.1	111	139.7	90	114.9
Auburn*	31,551	35	107.8	43	134.3	42	129.4	39	118.4	40	119.8
North Tonawanda	14,084	15	106.5	12	87.0	12	88.9	6	45.5	12	93.0
Amsterdam	35,412	35	98.8	47	134.8	42	122.4	45	133.2	29	87.3
Rochester*	262,661	254	96.7	242	94.2	254	102.2	223	92.0	229	96.9
Oswego	26,232	25	95.3	14	54.2	22	86.5	17	67.9	9	36.6
Syracuse*	148,175	141	95.2	136	92.7	132	90.9	164	114.0	142	99.7
Hudson	11,576	11	95.0	14	121.1	13	112.6	19	164.8	15	130.3
Watertown	26,936	25	92.8	22	81.7	13	48.3	29	107.9	33	122.9
Canandaigua	7,605	7	92.0	6	79.4	7	93.3	2	26.8	6	81.1
Norwich	8,696	8	92.0	2	23.5	8	95.9	8	98.0	4	50.1
Glens Falls	16,745	15	89.6	12	72.6	23	140.9	22	136.5	17	106.9
Dunkirk	17,923	16	89.3	20	111.8	11	61.6	12	67.6	18	102.0
Rensselaer	11,409	10	87.7	8	70.7	7	62.4	8	72.0	13	118.1
Poughkeepsie	34,578	29	83.9	21	62.4	20	61.1	24	75.5	22	71.3
Port Chester, village	16,030	13	81.1	13	112.3	17	112.4	13	89.8	17	114.6
Elmira*	41,235	33	80.0	30	73.8	25	62.4	27	68.3	31	79.6
Saratoga Springs	14,237	11	77.3	27	192.7	15	108.8	15	108.9	26	189.0
Schenectady	83,153	64	77.0	53	64.8	58	72.2	59	74.7	65	83.8
Niagara Falls	46,913	35	74.6	41	92.0	27	63.9	29	72.6	24	63.8

* Rates for cities so indicated are unfavorably affected by the inclusion of deaths from tuberculosis in State institutions or county hospitals located there.

Table 15 — *Number of deaths from pulmonary tuberculosis in each city of the State, with annual death rates per* 100,000 *population:* **1913–1917** — (Concluded)

(Cities listed in order of death rates, highest to lowest, for 1917)

	Estimated population 1917	1917		1916		1915		1914		1913	
		Total deaths	Rate	Total deaths	Rate	Total deaths	Rate	Total deaths	Rate	Total deaths	Rate
Port Jervis	9,351	7	74.4	20	213.2	12	127.5	17	180.1	15	158.3
Cortland	12,707	9	70.8	11	87.7	2	16.2	9	73.7	10	83.1
Hornell	14,638	10	68.3	10	69.0	8	55.7	15	105.6	3	21.3
Mechanicville	8,821	6	68.0	6	70.5	3	36.5	4	50.6	5	65.8
Gloversville	21,357	14	65.5	9	42.3	12	56.7	24	113.8	17	81.0
Batavia	13,920	9	64.7	19	139.7	8	60.3	7	54.0	8	63.3
White Plains	20,093	13	64.7	20	101.6	8	41.5	18	95.3	21	113.6
Salamanca	9,388	6	63.9	5	56.3	2	23.9	6	76.3	4	54.4
Tonawanda	9,483	6	63.3	11	118.1	6	65.6	6	66.8	2	22.7
Little Falls	13,300	8	60.2	13	98.8	19	145.9	14	108.7	13	102.0
Oneonta	10,848	6	55.3	7	65.7	6	57.3	2	19.4	4	39.6
Ithaca	17,524	9	51.4	12	70.0	7	41.8	17	103.9	9	56.3
Oneida	9,912	5	50.4	9	92.9	5	52.8	8	86.6	6	66.6
Mount Vernon	40,146	20	49.8	21	54.0	26	69.2	18	49.6	30	85.7
Johnstown	10,771	4	37.1	8	74.6	8	74.9	5	47.0	12	113.2
Fulton	11,373	4	35.2	10	88.8	12	107.7	8	72.6	5	45.8
New Rochelle	32,770	11	33.6	23	71.3	30	94.5	22	70.4	23	74.8
Geneva	13,542	4	29.5	8	59.8	12	91.0	8	61.2	4	31.0
Olean	19,169	4	20.9	14	75.5	18	100.4	12	69.4	14	83.9
City of Sherrill	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age*

	STATE AND SUBDIVISIONS, BY COUNTIES*	Total deaths (still-births excluded)	Age in Years						
			Under 1 year	1 to 4	Total under 5 years	5 to 9	10 to 14	15 to 19	Total 5 to 19
1	**STATE OF NEW YORK**	154,127	22,473	8,955	31,428	2,856	1,727	2,821	7,404
2	**New York City**	78,575	12,565	5,697	18,262	1,703	966	1,573	4,242
3	**Remainder of State**	75,552	9,908	3,258	13,166	1,153	761	1,248	3,162
4	**Cities**	38,947	6,157	2,094	8,251	705	421	695	1,821
5	**Villages**	11,994	1,329	447	1,776	189	102	176	467
6	**Towns**	24,611	2,422	717	3,139	259	238	377	874
7	ALBANY COUNTY	3,194	434	156	590	44	26	64	134
8	Albany	2,029	245	96	341	26	14	45	85
9	Cohoes	435	85	22	107	8	6	8	22
10	Watervliet	246	47	11	58	6	2	6	14
11	Green Island	60	9	5	14	.....	1	.....	1
12	Other villages	43	5	2	7	.....	.....	.....	.....
13	Towns	381	43	20	63	4	3	5	12
14	ALLEGANY COUNTY	589	54	16	70	6	3	9	18
15	Wellsville	93	8	2	10	2	1	3	6
16	Other villages	140	9	5	14	1	.....	1	2
17	Towns	356	37	9	46	3	2	5	10
18	BROOME COUNTY	1,928	249	117	366	41	23	23	87
19	Binghamton	1,226	170	75	245	24	13	18	55
20	—Binghamton State Hospital	214	.....	.....	.....	.....	.....	4	4
21	Endicott	94	27	14	41	4	.....	.....	4
22	Johnson City	126	13	11	24	4	4	3	11
23	Other villages	100	7	5	12	.....	2	.....	2
24	Towns	382	32	12	44	9	4	2	15
25	CATTARAUGUS COUNTY	1,015	116	38	154	15	14	18	47
26	Olean	267	44	15	59	4	5	7	16
27	Salamanca	120	12	8	20	3	1	3	7
28	Villages	176	16	3	19	.....	.....	1	1
29	Towns	452	44	12	56	8	8	7	23
30	CAYUGA COUNTY	1,051	100	37	137	15	8	13	36
31	Auburn	547	70	24	94	10	3	12	25
32	—Auburn State Prison	9	.....	.....	.....	.....	.....	.....	.....
33	Villages	133	5	2	7	3	1	.....	4
34	Towns	371	25	11	36	2	4	1	7
35	CHAUTAUQUA COUNTY	1,623	216	70	286	22	18	41	81
36	Dunkirk	311	62	27	89	6	1	9	16
37	Jamestown	525	72	27	99	7	6	18	31
38	Fredonia	80	11	4	15	2	.....	2	4
39	Silver Creek	32	5	1	6	.....	.....	1	1
40	Westfield	50	7	.....	7	.....	.....	.....	.....
41	Other villages	117	11	3	14	3	2	4	9
42	Towns	508	48	8	56	4	9	7	20
43	CHEMUNG COUNTY	1,070	119	34	153	10	12	16	38
44	Elmira	748	88	24	112	6	11	14	31
45	—Elmira State Reformatory	1	.....	.....	.....	.....	.....	1	1
46	Elmira Heights	48	9	4	13	2	.....	.....	2
47	Other villages	60	3	1	4	1	.....	1	2
48	Towns	214	19	5	24	1	1	1	3

*Deaths in State Institutions separately stated, although

in the State during 1917, *with total for other villages and towns in each periods and important causes*

	STATE AND SUBDIVISIONS, BY COUNTIES*	AGE IN YEARS						
		20 to 29	30 to 39	40 to 49	Total 20 to 49	50 to 59	60 and over	Unknown
1	**STATE OF NEW YORK**	10,176	13,302	16,962	40,449	20,347	54,438	70
2	**New York City**	5,698	7,917	10,034	23,699	11,295	21,079	.....
3	**Remainder of State**	4,478	5,385	6,878	16,741	9,054	33,359	70
4	**Cities**	2,602	3,154	4,092	9,848	5,074	13,938	15
5	**Villages**	651	745	891	2,287	1,233	6,167	14
6	**Towns**	1,225	1,486	1,895	4,605	2,697	13,254	41
7	ALBANY COUNTY	183	244	360	787	392	1,289	2
8	Albany	127	167	260	554	262	787	.....
9	Cohoes	27	36	47	110	54	141	1
10	Watervliet	14	15	19	48	31	95	.....
11	Green Island	4	2	5	11	5	29	.....
12	Other villages	5	4	1	10	8	18	.....
13	Towns	6	20	28	54	32	219	1
14	ALLEGANY COUNTY	14	29	34	77	69	355	.....
15	Wellsville	2	10	8	20	12	45	.....
16	Other villages	4	6	8	18	18	88	.....
17	Towns	8	13	18	39	39	222	.....
18	BROOME COUNTY	92	144	204	440	236	799	.....
19	Binghamton	62	104	146	312	165	449	.....
20	—Binghamton State Hospital	3	18	41	62	40	108	.....
21	Endicott	7	6	6	19	10	20	.....
22	Johnson City	9	9	13	31	11	49	.....
23	Other villages	7	11	6	24	12	50	.....
24	Towns	7	14	33	54	38	231	.....
25	CATTARAUGUS COUNTY	48	82	73	203	109	502	.....
26	Olean	14	20	30	64	33	95	.....
27	Salamanca	7	19	11	37	13	43	.....
28	Villages	7	11	12	30	22	104	.....
29	Towns	20	32	20	72	41	260	.....
30	CAYUGA COUNTY	38	47	66	151	115	609	3
31	Auburn	29	30	39	98	70	259	1
32	—Auburn State Prison	2	2	2	6	1	2	.....
33	Villages	3	4	7	14	14	93	1
34	Towns	6	13	20	39	31	257	1
35	CHAUTAUQUA COUNTY	95	93	132	320	176	760	.....
36	Dunkirk	28	28	26	82	26	98	.....
37	Jamestown	40	34	62	136	67	192	.....
38	Fredonia	1	6	3	10	8	43	.....
39	Silver Creek	2	3	2	7	4	14	.....
40	Westfield	5	3	1	9	3	31	.....
41	Other villages	1	3	7	11	5	78	.....
42	Towns	18	16	31	65	63	304	.....
43	CHEMUNG COUNTY	55	74	89	218	130	530	1
44	Elmira	48	59	72	179	99	327	.....
45	—Elmira State Reformatory	.....	.....	.....	.....	.....	.....	.....
46	Elmira Heights	3	4	1	8	5	20	.....
47	Other villages	2	2	3	7	7	40	.....
48	Towns	2	9	13	24	19	143	1

included also in totals of districts in which located.

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

	STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths all causes (still-births excluded)	Typhoid fever (1)	Smallpox (5)	Measles (6)	Scarlet fever (7)	Whooping cough (8)	Diphtheria (9)	Influenza (10)	Tuberculosis (all forms) (28-35)
1	**STATE OF NEW YORK**	**154,127**	**593**	**4**	**904**	**259**	**894**	**1,755**	**1,694**	**16,632**
2	**New York City**	**78,575**	**229**	....	**560**	**120**	**489**	**1,158**	**657**	**10,142**
3	**Remainder of State**	**75,552**	**364**	**4**	**344**	**139**	**405**	**597**	**1,037**	**6,490**
4	**Cities**	**38,947**	**212**	**4**	**218**	**101**	**238**	**378**	**319**	**3,414**
5	**Villages**	**11,994**	**62**	....	**39**	**19**	**57**	**95**	**219**	**997**
6	**Towns**	**24,611**	**90**	....	**87**	**19**	**110**	**124**	**499**	**2,079**
7	**ALBANY COUNTY**	**3,194**	**22**	**2**	**38**	....	**9**	**16**	**31**	**335**
8	Albany	2,029	13	1	34	....	2	10	18	238
9	Cohoes	435	3	....	1	....	5	2	3	43
10	Watervliet	246	1	1	....	....	....	3	2	18
11	Green Island	60	....	....	2	....	....	....	....	6
12	Other villages	43	2	....	....	....	....	1	3	6
13	Towns	381	3	....	1	....	2	....	5	24
14	**ALLEGANY COUNTY**	**589**	**4**	....	**1**	....	**2**	**1**	**13**	**28**
15	Wellsville	93	3	....	....	....	....	....	1	3
16	Other villages	140	....	....	....	....	....	....	4	8
17	Towns	356	1	....	1	....	2	1	8	17
18	**BROOME COUNTY**	**1,928**	**9**	....	**11**	**7**	**20**	**40**	**33**	**120**
19	Binghamton	1,226	7	....	7	2	13	24	10	103
20	—Binghamton State Hospital	214	....	....	1	....	....	....	....	28
21	Endicott	94	....	....	1	2	1	3	3	5
22	Johnson City	126	....	....	1	1	1	5	1	3
23	Other villages	100	2	....	....	2	....	1	4	4
24	Towns	382	....	....	2	....	5	7	15	5
25	**CATTARAUGUS COUNTY**	**1,015**	**2**	....	**4**	....	**3**	**7**	**12**	**54**
26	Olean	267	1	....	....	....	2	4	3	5
27	Salamanca	120	....	....	....	....	....	1	2	7
28	Villages	176	1	....	....	....	....	....	1	12
29	Towns	452	....	....	4	....	1	2	6	30
30	**CAYUGA COUNTY**	**1,051**	**3**	....	**2**	....	**1**	**10**	**10**	**53**
31	Auburn	547	2	....	....	....	....	8	3	36
32	—Auburn State Prison	9	....	....	....	....	....	....	....	1
33	Villages	133	....	....	....	....	....	1	2	4
34	Towns	371	1	....	2	....	1	1	5	13
35	**CHAUTAUQUA COUNTY**	**1,623**	**4**	....	**5**	**4**	**19**	**5**	**48**	**114**
36	Dunkirk	311	1	....	....	....	8	1	22	21
37	Jamestown	525	2	....	2	2	4	3	6	55
38	Fredonia	80	....	....	....	....	3	....	....	5
39	Silver Creek	32	....	....	....	....	1	....	....	1
40	Westfield	50	....	....	....	....	....	....	2	5
41	Other villages	117	....	....	1	2	1	....	3	5
42	Towns	508	1	....	2	....	2	1	15	22
43	**CHEMUNG COUNTY**	**1,070**	**5**	....	....	**3**	**2**	**3**	**16**	**57**
44	Elmira	748	5	....	....	2	1	2	8	39
45	—Elmira State Reformatory	1	....	....	....	....	....	....	....	....
46	Elmira Heights	48	....	....	....	1	....	1	....	5
47	Other villages	60	....	....	....	....	....	....	2	4
48	Towns	214	....	....	....	....	1	....	6	9

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH														
Pulmonary tuberculosis (23–29)	Tuberculous meningitis (30)	Other forms of tuberculosis (31-35)	Cancer (39-45)	Diabetes (50)	Cerebrospinal meningitis (61b, c)	Acute anterior poliomyelitis (63a)	Apoplexy and cerebral hemorrhage (64)	Organic heart disease (79)	Arteriosclerosis (81)	Bronchitis (89, 90)	Pneumonia (all forms) (91, 92)	Bronchopneumonia (91)	Lobar pneumonia and unqualified (92)	
14,795	**1,077**	**760**	**9,736**	**2,281**	**314**	**92**	**6,796**	**21,688**	**4,825**	**1,850**	**18,673**	**6,604**	**12,069**	1
9,120	**680**	**342**	**4,867**	**1,153**	**185**	**53**	**794**	**11,102**	**2,903**	**924**	**11,051**	**3,783**	**7,268**	2
5,675	**397**	**418**	**4,869**	**1,128**	**129**	**39**	**6,002**	**10,586**	**1,922**	**926**	**7,622**	**2,821**	**4,801**	3
2,898	**274**	**242**	**2,531**	**583**	**89**	**16**	**2,695**	**4,889**	**778**	**404**	**4,175**	**1,517**	**2,658**	4
870	**57**	**70**	**794**	**192**	**17**	**4**	**1,094**	**1,815**	**345**	**151**	**1,118**	**408**	**710**	5
1,907	**66**	**106**	**1,544**	**353**	**23**	**19**	**2,213**	**3,882**	**799**	**371**	**2,329**	**896**	**1,433**	6
299	**16**	**20**	**234**	**51**	**12**	**4**	**235**	**448**	**97**	**24**	**336**	**126**	**210**	7
212	11	15	159	32	7	2	139	273	65	19	189	63	126	8
36	3	4	27	10	4	.....	25	51	10	2	57	25	32	9
18	.....	.....	18	3	1	.....	21	35	.....	3	40	20	20	10
6	.....	.....	5	.....	.....	.....	5	14	2	.....	8	4	4	11
6	.....	.....	1	.....	.....	.....	4	6	2	.....	4	.....	4	12
21	2	1	24	6	.....	2	41	69	18	.....	38	14	24	13
21	**1**	**6**	**44**	**17**	.....	.....	**53**	**119**	**28**	**13**	**45**	**10**	**35**	14
2	.....	1	7	2	.....	.....	2	26	6	1	5	2	3	15
6	.....	2	10	4	.....	.....	17	24	7	1	16	2	14	16
13	1	3	27	11	.....	.....	34	69	15	11	24	6	18	17
96	**11**	**13**	**108**	**18**	**2**	**1**	**138**	**255**	**52**	**24**	**230**	**70**	**160**	18
84	9	10	69	10	2	1	74	157	28	14	150	45	105	19
28	.....	.....	2	.....	.....	.....	3	32	14	.....	43	21	22	20
5	.....	.....	1	2	.....	.....	4	6	.....	2	14	7	7	21
.....	2	1	7	1	.....	.....	9	16	2	1	24	5	19	22
4	.....	.....	8	2	.....	.....	11	14	2	.....	7	3	4	23
3	.....	2	23	3	.....	.....	40	62	20	7	35	10	25	24
48	**1**	**5**	**73**	**16**	**2**	**3**	**85**	**155**	**31**	**10**	**104**	**30**	**74**	25
4	.....	1	19	5	2	.....	14	26	5	1	35	9	26	26
6	.....	1	8	1	.....	.....	4	19	.....	3	16	6	10	27
9	1	2	10	3	.....	1	21	28	13	3	14	5	9	28
29	.....	1	36	7	.....	2	46	82	13	3	39	10	29	29
51	.....	**2**	**88**	**20**	.....	.....	**118**	**198**	**23**	**8**	**95**	**30**	**65**	30
35	.....	1	50	11	.....	.....	59	89	3	4	55	15	40	31
1	.....	.....	.....	.....	.....	.....	.....	1	.....	1	3	.....	3	32
4	.....	.....	7	3	.....	.....	15	35	5	2	8	3	5	33
12	.....	1	31	6	.....	.....	44	74	15	2	32	12	20	34
95	**11**	**8**	**102**	**22**	**4**	**1**	**126**	**230**	**35**	**32**	**120**	**44**	**76**	35
16	3	2	10	3	.....	.....	16	33	4	5	28	13	15	36
44	7	4	48	6	1	1	46	55	16	6	36	10	26	37
5	.....	.....	6	.....	2	.....	6	18	2	3	3	1	2	38
1	.....	.....	1	.....	.....	.....	2	7	.....	1	5	.....	5	39
5	.....	.....	3	1	.....	.....	3	9	1	.....	2	.....	2	40
4	.....	1	9	4	.....	.....	11	21	2	4	5	4	1	41
20	1	1	25	8	1	.....	42	87	10	13	41	16	25	42
44	**3**	**10**	**77**	**22**	**2**	.....	**77**	**150**	**19**	**8**	**110**	**44**	**66**	43
33	2	4	53	18	1	.....	46	97	17	6	77	32	45	44
.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	45
5	.....	.....	2	.....	.....	.....	8	4	.....	.....	4	.....	4	46
1	.....	3	5	1	.....	.....	9	8	.....	.....	4	2	2	47
5	1	**3**	**17**	**3**	1	.....	**14**	**41**	2	2	**25**	**10**	**15**	48

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

STATE AND SUBDIVISIONS, BY COUNTIES	Diarrhea and enteritis (under 2 years) (104)	Appendicitis (108)	Hernia, intestinal obstruction (109)	Cirrhosis of liver (113)	Nephritis and Bright's disease (119, 120)	Puerperal septicemia (137)	Other puerperal affections (134-136, 138-141)	Total diseases peculiar to early infancy (150-153)	Congenital malformations (150)
1 **STATE OF NEW YORK**	5,624	1,191	1,285	1,319	13,136	469	864	9,745	1,472
2 **New York City**	3,181	668	601	668	6,727	213	438	5,212	698
3 **Remainder of State**	2,443	523	684	651	6,409	256	426	4,533	774
4 **Cities**	1,725	396	413	344	3,343	163	263	2,695	430
5 **Villages**	313	58	90	115	996	44	63	627	101
6 **Towns**	405	69	181	192	2,070	49	100	1,211	243
7 ALBANY COUNTY	92	20	31	32	255	8	25	212	37
8 Albany	44	17	20	21	162	8	14	125	25
9 Cohoes	27	3	6	4	35	.....	5	31	4
10 Watervliet	10	.....	.....	1	15	.....	2	29	2
11 Green Island	1	.....	.....	.....	2	.....	.....	6	1
12 Other villages	3	.....	1	.....	2	.....	.....	1	.....
13 Towns	7	.....	4	6	39	.....	4	20	5
14 ALLEGANY COUNTY	6	4	5	3	50	3	2	30	8
15 Wellsville	3	2	.....	.....	6	.....	.....	4	1
16 Other villages	3	.....	1	2	14	.....	1	5	3
17 Towns	.....	2	4	1	30	3	1	21	4
18 BROOME COUNTY	72	13	16	16	133	10	9	126	27
19 Binghamton	50	7	11	8	95	6	4	85	15
20 —Binghamton State Hospital	.....	.....	2	.....	23	.....	.....	.....	.....
21 Endicott	11	.....	1	.....	3	1	2	13	3
22 Johnson City	2	4	2	2	3	3	1	8	3
23 Other villages	2	.....	1	1	5	.....	1	4	1
24 Towns	7	2	1	5	27	.....	1	16	5
25 CATTARAUGUS COUNTY	14	7	14	11	80	5	12	59	6
26 Olean	4	5	6	1	22	3	7	27	3
27 Salamanca	5	1	1	3	7	.....	2	4	.....
28 Villages	3	.....	1	3	15	1	1	5	2
29 Towns	2	1	6	4	36	1	2	23	1
30 CAYUGA COUNTY	29	4	11	8	77	2	9	51	10
31 Auburn	22	3	6	4	36	.....	6	34	5
32 —Auburn State Prison	.....	.....	1	.....	.....	.....	.....	.....	.....
33 Villages	1	.....	2	.....	9	1	.....	4	1
34 Towns	6	1	3	4	32	1	3	13	4
35 CHAUTAUQUA COUNTY	29	5	24	21	101	4	13	116	15
36 Dunkirk	10	1	5	2	16	.....	2	32	9
37 Jamestown	6	3	12	5	29	3	6	44	4
38 Fredonia	1	.....	.....	2	8	.....	1	7	.....
39 Silver Creek	2	.....	2	2	1	.....	.....	2	.....
40 Westfield	3	.....	.....	.....	5	1	2	1	.....
41 Other villages	2	.....	.....	1	9	.....	.....	5	1
42 Towns	5	1	5	9	33	.....	2	25	1
43 CHEMUNG COUNTY	19	9	20	6	135	6	9	69	10
44 Elmira	16	9	15	4	97	4	9	52	8
45 —Elmira State Reformatory	.....	.....	.....	.....	.....	.....	.....	.....	.....
46 Elmira Heights	1	.....	1	.....	6	.....	.....	5	1
47 Other villages	.....	.....	.....	1	11	1	.....	2	.....
48 Towns	2	.....	4	1	21	1	.....	10	1

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH — *Concluded*

Premature birth (151a)	Congenital debility (151b)	Other causes peculiar to early infancy (152-153)	Old age (154)	Total accidents (164-181, 185-186)	Railroad accidents (175a)	Automobile accidents (175c)	Drowning (169)	Other accidents	Suicides (155-163)	Homicides (182-184)	All other causes	
4,736	**1,576**	**1,961**	**885**	**9,274**	**831**	**1,066**	**994**	**6,383**	**1,441**	**426**	**19,478**	1
2,433	**954**	**1,127**	**271**	**4,716**	**98**	**518**	**504**	**3,596**	**778**	**248**	**8,467**	2
2,303	**622**	**834**	**614**	**4,558**	**733**	**548**	**490**	**2,787**	**663**	**178**	**11,011**	3
1,434	**334**	**497**	**180**	**2,410**	**334**	**331**	**174**	**1,571**	**326**	**112**	**5,533**	4
309	88	129	146	684	144	78	80	382	105	19	1,716	5
560	200	208	288	1,464	255	139	236	834	232	47	3,762	6
102	**34**	**39**	**15**	178	**20**	**23**	**29**	**106**	**23**	**10**	**399**	7
59	19	22	8	111	12	20	11	68	15	5	278	8
19	2	6	1	31	5	1	8	17	1	1	47	9
17	6	4	4	10	.....	1	2	7	1	3	25	10
2	.....	3	.....	3	2	.....	.....	1	3	1	2	11
.....	1	.....	.....	2	1	.....	.....	1	1	.....	4	12
5	6	4	2	21	.....	1	8	12	2	.....	43	13
9	**3**	**10**	**4**	**28**	**3**	.....	**1**	**24**	**5**	.....	**81**	14
2	.....	1	.....	9	.....	.....	.....	9	1	.....	12	15
1	.....	1	.....	4	2	.....	.....	2	1	.....	18	16
6	3	8	4	15	1	.....	1	13	3	.....	51	17
49	**23**	**27**	**8**	**111**	**23**	**6**	**6**	**76**	**13**	**2**	**331**	18
36	15	19	2	57	6	5	4	42	9	2	219	19
.....	.....	.....	.....	5	1	.....	.....	4	1	.....	60	20
3	4	3	.....	5	1	.....	.....	4	.....	.....	14	21
4	1	.....	.....	14	4	1	1	8	.....	.....	15	22
.....	1	2	.....	10	4	.....	.....	6	.....	.....	19	23
6	2	3	6	25	8	.....	1	16	4	.....	64	24
39	**6**	**8**	**10**	**94**	**25**	**8**	**4**	**57**	**11**	**2**	**135**	25
17	5	2	.....	23	1	5	1	16	3	1	43	26
2	.....	2	2	18	7	.....	1	10	2	.....	14	27
1	1	1	.....	16	5	3	.....	8	4	.....	20	28
19	.....	3	8	37	12	.....	2	23	2	1	58	29
27	**8**	**6**	**22**	**51**	**5**	**6**	**6**	**34**	**11**	.....	**147**	30
19	8	2	12	26	3	1	1	21	6	.....	72	31
.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	32
3	.....	.....	2	5	.....	.....	3	2	1	.....	26	33
5	.....	4	8	20	2	5	2	11	4	.....	49	34
61	**15**	**25**	**23**	**117**	**21**	**16**	**10**	**70**	**14**	**5**	**280**	35
16	.....	7	2	35	8	8	1	18	.....	1	53	36
23	7	10	2	30	4	3	1	22	5	4	87	37
3	1	3	1	3	.....	1	.....	2	.....	.....	9	38
1	1	.....	.....	1	1	.....	.....	.....	1	.....	3	39
.....	.....	1	1	1	.....	.....	.....	1	1	.....	9	40
2	2	.....	2	6	1	1	1	3	1	.....	23	41
16	4	4	15	41	7	3	7	24	6	.....	96	42
34	**14**	**11**	**10**	**78**	**22**	**10**	**3**	**43**	**6**	**2**	**150**	43
27	7	10	4	55	14	7	1	33	6	1	104	44
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45
3	1	.....	.....	4	1	.....	.....	3	.....	.....	6	46
.....	1	1	.....	6	2	3	.....	1	.....	.....	6	47
4	5	.....	6	13	5	.....	2	6	.....	1	34	48

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths (still-births excluded)	Age in Years						
		Under 1 year	1 to 4	Total under 5 years	5 to 9	10 to 14	15 to 19	Total 5 to 19
49 CHENANGO COUNTY	**664**	**56**	**10**	**66**	**6**	**8**	**8**	**22**
50 Norwich	158	21	2	23	1	2	3	6
51 Villages	144	9	1	10	1	1	.....	2
52 Towns	362	26	7	33	4	5	5	14
53 —Woman's Relief Corps Home, Oxford	33	.....	.....	.....	.....	.....	.....	.....
54 CLINTON COUNTY	**682**	**120**	**31**	**151**	**6**	**7**	**15**	**28**
55 Plattsburg	204	30	9	39	2	2	9	13
56 Villages	105	9	4	13	.....	2	2	4
57 Towns	373	81	18	99	4	3	4	11
58 —Clinton Prison	20	.....	.....	.....	.....	.....	.....	.....
59 —Dannemora State Hospital	17	.....	.....	.....	.....	.....	.....	.....
60 COLUMBIA COUNTY	**716**	**71**	**20**	**91**	**6**	**2**	**9**	**17**
61 Hudson	231	37	8	45	3	1	3	7
62 —State Training School for Girls, Hudson	1	.....	.....	.....	.....	.....	.....	.....
63 Villages	102	6	3	9	1	.....	2	3
64 Towns	383	28	9	37	2	1	4	7
65 CORTLAND COUNTY	**570**	**57**	**11**	**68**	**7**	**8**	**12**	**27**
66 Cortland	273	32	6	38	4	8	5	17
67 Homer	61	2	.....	2	.....	.....	2	2
68 Other villages	34	1	1	2	.....	.....	1	1
69 Towns	202	22	4	26	3	.....	4	7
70 DELAWARE COUNTY	**694**	**73**	**27**	**100**	**7**	**5**	**15**	**27**
71 Sidney	41	7	3	10	1	.....	.....	1
72 Walton	58	5	1	6	.....	1	.....	1
73 Other villages	145	8	5	13	4	.....	3	7
74 Towns	450	53	18	71	2	4	12	18
75 DUTCHESS COUNTY	**1,821**	**202**	**63**	**265**	**24**	**17**	**23**	**64**
76 Beacon	223	22	8	30	5	4	6	15
77 —Matteawan State Hospital	45	1	.....	1	.....	.....	.....	.....
78 Poughkeepsie	545	92	31	123	7	8	9	24
79 Wappingers Falls	58	7	4	11	1	.....	.....	1
80 Other villages	124	12	3	15	2	1	1	4
81 Towns	871	69	17	86	9	4	7	20
82 —Hudson River State Hospital	315	.....	.....	.....	.....	.....	1	1
83 ERIE COUNTY	**9,449**	**1,860**	**555**	**2,415**	**183**	**117**	**164**	**464**
84 Buffalo	7,664	1,403	417	1,820	160	97	141	398
85 —Buffalo State Hospital	202	1	.....	1	.....	.....	.....	.....
86 Lackawanna	448	260	88	348	3	2	5	10
87 Tonawanda	119	17	8	25	2	1	2	5
88 Depew	62	31	5	36	1	2	3	6
89 East Aurora	44	3	.....	3	.....	.....	.....	.....
90 Hamburg	37	6	2	8	2	1	1	4
91 Lancaster	56	14	3	17	.....	.....	.....	.....
92 Springville	35	2	.....	2	1	.....	1	2
93 Other villages	137	13	4	17	4	1	2	7
94 Towns	847	111	28	139	10	13	9	32
95 —Gowanda State Hospital	114	.....	.....	.....	.....	.....	.....	.....

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

	STATE AND SUBDIVISIONS, BY COUNTIES	AGE IN YEARS						
		20 to 29	30 to 39	40 to 49	Total 20 to 49	50 to 59	60 and over	Unknown
49	CHENANGO COUNTY	19	22	34	75	63	438	.....
50	Norwich	4	8	13	25	21	83	.....
51	Villages	6	.....	7	13	11	108	.....
52	Towns	9	14	14	37	31	247	.....
53	—Woman's Relief Corps Home, Oxford	.....	.....	.....	.....	.....	33	.....
54	CLINTON COUNTY	55	51	45	151	59	293	.....
55	Plattsburg	23	18	18	59	17	76	.....
56	Villages	14	17	11	42	6	40	.....
57	Towns	18	16	16	50	36	177	.....
58	—Clinton Prison	6	8	3	17	1	2	.....
59	—Dannemora State Hospital	5	7	3	15	1	1	.....
60	COLUMBIA COUNTY	27	36	54	117	79	411	1
61	Hudson	14	13	25	52	22	105	.....
62	—State Training School for Girls, Hudson	.....	1	.....	1	.....	.....	.....
63	Villages	5	6	5	16	15	59	.....
64	Towns	8	17	24	49	42	247	1
65	CORTLAND COUNTY	22	27	39	88	61	325	1
66	Cortland	10	19	26	55	36	126	1
67	Homer	3	2	5	10	4	43	.....
68	Other villages	.....	1	.....	1	6	24	.....
69	Towns	9	5	8	22	15	132	.....
70	DELAWARE COUNTY	26	19	49	94	67	404	2
71	Sidney	3	.....	.....	3	5	22	.....
72	Walton	1	2	7	10	7	34	.....
73	Other villages	7	3	10	20	11	94	.....
74	Towns	15	14	32	61	44	254	2
75	DUTCHESS COUNTY	96	128	175	399	236	855	2
76	Beacon	5	18	24	47	37	93	1
77	—Matteawan State Hospital	1	10	6	17	12	15	.....
78	Poughkeespie	29	28	43	100	62	236	.....
79	Wappingers Falls	3	2	4	9	8	29	.....
80	Other villages	4	6	5	15	10	80	.....
81	Towns	55	74	99	228	119	417	1
82	—Hudson River State Hospital	17	43	63	123	63	128	.....
83	ERIE COUNTY	765	862	997	2,624	1,251	2,693	2
84	Buffalo	665	733	889	2,287	1,067	2,092	.....
85	—Buffalo State Hospital	9	27	27	63	45	93	.....
86	Lackawanna	27	27	9	63	16	10	1
87	Tonawanda	6	14	5	25	17	47	.....
88	Depew	4	4	5	13	3	4	.....
89	East Aurora	.....	2	3	5	8	28	.....
90	Hamburg	2	1	1	4	3	18	.....
91	Lancaster	1	5	7	13	6	20	.....
92	Springville	.....	3	.....	3	8	20	.....
93	Other villages	7	9	7	23	14	76	.....
94	Towns	53	64	71	188	109	378	1
95	—Gowanda State Hospital	4	16	28	48	26	40	.....

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

	STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths all causes (still-births excluded)	Typhoid fever (1)	Smallpox (5)	Measles (6)	Scarlet fever (7)	Whooping cough (8)	Diphtheria (9)	Influenza (10)	Tuberculosis (all forms) (28-35)
49	CHENANGO COUNTY	664	3	....	1	....	....	.....	12	34
50	Norwich	158	....	....	....	....	....	.....	3	10
51	Villages	144	3	....	1	....	....	.....	3	7
52	Towns	362	....	....	....	....	....	.....	6	17
53	—Woman's Relief Corps Home, Oxford	33	....	....	....	....	....	.....	.....	.....
54	CLINTON COUNTY	682	9	1	1	1	9	12	10	70
55	Plattsburg	204	4	1	....	1	2	1	1	14
56	Villages	105	3	....	....	....	1	3	2	28
57	Towns	373	2	....	1	....	6	8	7	28
58	—Clinton Prison	20	....	....	....	....	....	.....	.....	16
59	—Dannemora State Hospital	17	....	....	....	....	....	.....	.....	10
60	COLUMBIA COUNTY	716	4	....	1	1	3	1	15	50
61	Hudson	231	2	....	....	....	....	.....	2	13
62	—State Training School for Girls, Hudson	1	....	....	....	....	....	.....	.....	.....
63	Villages	102	....	....	....	....	1	.....	2	10
64	Towns	383	2	....	1	1	2	1	11	27
65	CORTLAND COUNTY	570	2	....	1	4	....	1	3	31
66	Cortland	273	1	....	....	1	....	.....	3	16
67	Homer	61	1	....	....	....	....	.....	.....	3
68	Other villages	34	....	....	....	....	....	.....	.....	3
69	Towns	202	....	....	1	3	....	1	.....	9
70	DELAWARE COUNTY	694	6	....	1	....	5	1	17	34
71	Sidney	41	1	....	....	....	2	.....	1	.....
72	Walton	58	....	....	....	....	....	.....	1	2
73	Other villages	145	1	....	1	....	....	.....	5	9
74	Towns	450	4	....	....	....	3	1	10	23
75	DUTCHESS COUNTY	1,821	5	....	1	3	13	10	15	184
76	Beacon	223	....	....	1	....	5	.....	4	22
77	—Matteawan State Hospital	45	....	....	....	....	....	.....	.....	4
78	Poughkeepsie	545	3	....	....	....	4	3	1	34
79	Wappingers Falls	58	....	....	....	2	....	.....	2	4
80	Other villages	124	....	....	....	....	1	.....	3	6
81	Towns	871	2	....	....	1	3	7	5	118
82	—Hudson River State Hospital	315	....	....	....	....	....	3	.....	64
83	ERIE COUNTY	9,449	56	1	61	32	84	126	61	914
84	Buffalo	7,664	47	1	7	30	56	108	32	802
85	—Buffalo State Hospital	202	....	....	....	....	....	1	.....	15
86	Lackawanna	448	....	....	53	....	21	3	3	26
87	Tonawanda	119	....	....	....	....	....	1	3	6
88	Depew	62	....	....	....	....	....	.....	.....	3
89	East Aurora	44	....	....	....	....	....	.....	.....	3
90	Hamburg	37	....	....	....	....	....	1	.....	6
91	Lancaster	56	....	....	....	....	....	1	.....	1
92	Springville	35	1	....	....	....	....	1	.....	1
93	Other villages	137	....	....	....	....	1	2	6	6
94	Towns	847	8	....	1	2	6	9	17	60
95	—Gowanda State Hospital	114	7	....	1	....	....	.....	.....	8

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH														
Pulmonary tuberculosis (28-29)	Tuberculous meningitis (30)	Other forms of tuberculosis (31-35)	Cancer (39-45)	Diabetes (50)	Cerebrospinal meningitis (61b, c)	Acute anterior poliomyelitis (63a)	Apoplexy and cerebral hemorrhage (64)	Organic heart disease (79)	Arteriosclerosis (81)	Bronchitis (89, 90)	Pneumonia (all forms) (91, 92)	Bronchopneumonia (91)	Lobar pneumonia and unqualified (92)	
24	5	5	53	16	.....	1	68	145	22	13	62	17	45	49
8	2	.....	9	5	.....	.....	12	26	2	2	17	3	14	50
5	.....	2	16	1	.....	.....	17	33	7	2	16	2	14	51
11	3	3	28	10	.....	1	39	86	13	9	29	12	17	52
.....	.....	.....	2	1	.....	.....	3	10	9	1	1	1	.....	53
65	1	4	31	7	1	2	42	114	8	6	55	21	34	54
12	.....	2	11	3	.....	1	9	25	1	2	14	2	12	55
27	1	.....	2	1	.....	.....	6	16	3	1	5	1	4	56
26	.....	2	18	3	1	1	27	73	4	3	36	18	18	57
16	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	58
10	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	1	1	.....	59
46	3	1	63	12	.....	1	49	104	25	15	65	23	42	60
11	2	.....	14	8	.....	1	12	25	9	12	30	8	22	61
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	62
10	.....	.....	8	3	.....	.....	9	16	4	.....	10	4	6	63
25	1	1	41	1	.....	.....	28	63	12	3	25	11	14	64
19	4	8	37	8	1	.....	61	75	10	7	58	20	38	65
9	4	3	17	3	1	.....	28	27	2	1	25	2	23	66
1	.....	2	5	1	.....	.....	5	4	2	1	9	4	5	67
3	.....	.....	3	.....	.....	.....	7	9	1	.....	5	2	3	68
6	.....	3	12	4	.....	.....	21	35	5	5	19	12	7	69
28	2	4	40	8	1	.....	90	122	27	12	54	12	42	70
.....	.....	.....	2	.....	.....	.....	4	8	1	.....	1	.....	1	71
1	.....	1	5	.....	.....	.....	11	11	.....	.....	2	.....	2	72
6	1	2	3	5	.....	.....	10	26	12	1	7	2	5	73
21	1	1	30	3	1	.....	65	77	14	11	44	10	34	74
169	8	7	83	22	3	1	154	217	94	31	278	135	143	75
19	3	.....	16	2	.....	.....	19	17	5	2	28	8	20	76
4	.....	.....	3	.....	.....	.....	3	7	.....	.....	4	2	2	77
29	3	2	28	14	1	1	56	68	26	7	82	32	50	78
3	1	.....	3	.....	.....	.....	5	8	2	.....	12	6	6	79
4	.....	2	1	2	1	.....	16	18	7	3	15	7	8	80
114	1	3	35	4	1	.....	58	106	54	19	141	82	59	81
61	.....	3	3	.....	.....	.....	7	24	35	2	76	60	16	82
815	69	30	558	151	22	1	573	1,010	196	96	1,042	399	643	83
723	55	24	463	126	19	1	476	814	136	74	865	320	545	84
15	.....	.....	6	2	.....	.....	9	28	15	1	38	23	15	85
21	5	.....	1	.....	2	.....	4	4	2	7	40	18	22	86
6	.....	.....	16	1	.....	.....	9	18	4	.....	11	5	6	87
2	1	.....	2	.....	.....	.....	1	3	.....	.....	13	8	5	88
2	1	.....	8	.....	.....	.....	4	3	4	1	5	1	4	89
4	2	.....	2	2	.....	.....	1	4	2	.....	3	1	2	90
1	.....	.....	4	.....	.....	.....	4	16	.....	3	5	5	.....	91
1	.....	.....	5	2	.....	.....	5	6	1	.....	3	1	2	92
6	.....	.....	9	3	.....	.....	14	13	12	.....	15	4	11	93
49	5	6	48	17	1	.....	55	129	35	11	82	36	46	94
17	.....	1	1	.....	.....	.....	3	20	2	.....	9	4	5	95

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

STATE AND SUBDIVISIONS, BY COUNTIES	Diarrhea and enteritis (under 2 years) (104)	Appendicitis (108)	Hernia, intestinal obstruction (109)	Cirrhosis of liver (113)	Nephritis and Bright's disease (119, 120)	Puerperal septicemia (137)	Other puerperal affections (134-136, 138-141)	Total diseases peculiar to early infancy (150-153)	Congenital malformations (150)
49 CHENANGO COUNTY	6	3	3	1	59	3	3	43	8
50 Norwich	4	.....	.....	1	16	2	.....	17	2
51 Villages	2	.....	.....	.....	10	.....	.....	8	4
52 Towns	.....	3	3	.....	33	1	3	18	2
53 —Woman's Relief Corps Home, Oxford	.....	.....	1	.....	.....	.....	.....	.....	.....
54 CLINTON COUNTY	16	5	3	5	39	2	5	64	9
55 Plattsburg	4	5	3	.....	15	1	3	18	3
56 Villages	.....	.....	.....	2	3	.....	.....	4	.....
57 Towns	12	.....	.....	3	21	1	2	42	6
58 —Clinton Prison	.....	.....	.....	.....	1	.....	.....	.....	.....
59 —Dannemora State Hospital	.....	.....	.....	1	1	.....	.....	.....	.....
60 COLUMBIA COUNTY	15	1	8	2	75	1	3	38	11
61 Hudson	8	.....	6	.....	17	1	1	21	5
62 —State Training School for Girls, Hudson	.....	.....	.....	.....	.....	.....	.....	.....	.....
63 Villages	1	.....	.....	.....	12	.....	1	4	2
64 Towns	6	1	2	2	46	.....	1	13	4
65 CORTLAND COUNTY	10	7	6	3	53	.....	6	28	5
66 Cortland	7	4	5	1	32	.....	5	15	2
67 Homer	.....	1	.....	.....	2	.....	.....	2	.....
68 Other villages	.....	.....	1	.....	.....	.....	.....	.....	.....
69 Towns	3	2	.....	2	19	.....	1	11	3
70 DELAWARE COUNTY	7	4	11	3	40	3	2	38	8
71 Sidney	1	.....	2	.....	1	1	.....	1	.....
72 Walton	1	.....	.....	.....	6	.....	1	3	.....
73 Other villages	1	2	3	2	9	.....	1	4	2
74 Towns	4	2	6	1	24	2	.....	30	6
75 DUTCHESS COUNTY	34	8	11	11	112	3	10	94	13
76 Beacon	3	1	1	.....	27	1	2	10	2
77 —Matteawan State Hospital	.....	.....	.....	.....	7	.....	.....	1	.....
78 Poughkeepsie	17	3	2	5	29	1	5	39	4
79 Wappingers Falls	2	.....	1	.....	7	.....	.....	2	.....
80 Other villages	3	.....	.....	1	8	.....	.....	7	.....
81 Towns	9	4	7	5	41	1	3	36	7
82 —Hudson River State Hospital	.....	.....	3	.....	3	.....	.....	.....	.....
83 ERIE COUNTY	605	98	80	92	751	28	47	688	121
84 Buffalo	474	94	67	76	651	26	40	528	88
85 —Buffalo State Hospital	.....	.....	3	.....	15	.....	.....	.....	.....
86 Lackawanna	80	2	1	1	6	1	.....	68	10
87 Tonawanda	6	.....	.....	1	9	.....	.....	9	1
88 Depew	16	.....	.....	2	1	.....	1	8	.....
89 East Aurora	.....	.....	2	1	7	.....	.....	1	1
90 Hamburg	.....	.....	.....	.....	5	.....	.....	4	.....
91 Lancaster	4	.....	.....	2	4	.....	1	4	1
92 Springville	.....	1	.....	.....	.....	.....	.....	2	.....
93 Other villages	4	.....	1	.....	16	.....	.....	6	1
94 Towns	21	1	9	9	52	1	5	58	19
95 —Gowanda State Hospital	.....	.....	.....	.....	3	.....	1	.....	.....

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH — *Concluded*

Premature birth (151a)	Congenital debility (151b)	Other causes peculiar to early infancy (152-153)	Old age (154)	Total accidents (164-181, 185-183)	Railroad accidents (175a)	Automobile accidents (175c)	Drowning (169)	Other accidents	Suicides (155-163)	Homicides (182-184)	All other causes	
28	3	4	2	23	3	2	2	16	6	1	81	49
12	2	1	.....	5	1	.....	.....	4	2	.....	25	50
3	.....	1	.....	5	.....	1	.....	4	.....	1	12	51
13	1	2	2	13	2	1	2	8	2	.....	44	52
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	53
28	10	17	13	43	8	4	4	27	5	1	102	54
8	4	3	1	21	5	2	.....	14	2	.....	41	55
1	3	.....	2	8	2	.....	.....	6	1	1	13	56
19	3	14	10	14	1	2	4	7	2	.....	48	57
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	58
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	59
15	5	7	25	50	16	3	5	26	8	.....	81	60
8	2	6	1	12	2	.....	2	8	2	.....	32	61
.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	62
1	1	.....	5	5	3	.....	1	1	1	.....	16	63
6	2	1	19	33	11	3	2	17	3	.....	39	64
14	6	3	12	24	2	4	1	17	10	.....	112	65
9	3	1	5	16	2	3	1	10	4	.....	51	66
2	.....	.....	5	2	.....	.....	.....	2	1	.....	17	67
.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	4	68
3	3	2	2	6	.....	1	.....	5	4	.....	37	69
12	9	9	12	40	7	3	4	26	7	.....	109	70
.....	.....	1	4	1	.....	.....	1	.....	1	.....	9	71
2	.....	1	1	3	.....	.....	.....	3	.....	.....	11	72
1	1	.....	4	10	.....	2	.....	8	.....	.....	29	73
9	8	7	3	26	7	1	3	15	6	.....	60	74
53	14	14	5	89	22	12	6	49	9	1	320	75
7	.....	1	.....	13	3	3	1	6	1	.....	43	76
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16	77
25	2	8	.....	21	2	3	1	15	4	.....	91	78
1	.....	1	1	1	.....	.....	.....	1	.....	.....	6	79
5	.....	2	1	7	1	2	1	3	.....	.....	24	80
15	12	2	3	47	16	4	3	24	4	1	156	81
.....	.....	.....	.....	2	.....	.....	.....	2	.....	.....	93	82
374	77	116	21	646	104	88	41	413	72	37	1,300	83
307	40	93	18	509	62	80	23	344	53	36	1,035	84
.....	.....	.....	.....	2	.....	.....	.....	2	.....	.....	67	85
23	24	11	.....	40	10	3	.....	27	2	1	80	86
7	1	.....	.....	5	1	.....	3	1	2	.....	18	87
3	1	4	.....	9	4	.....	3	2	.....	.....	3	88
.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	4	89
4	.....	.....	1	1	1	.....	.....	.....	1	.....	4	90
.....	1	2	.....	1	1	.....	.....	.....	.....	.....	6	91
1	1	.....	1	2	.....	.....	.....	2	.....	.....	4	92
4	1	.....	.....	11	3	1	1	6	2	.....	16	93
25	8	6	1	67	22	4	11	30	12	.....	130	94
.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	58	95

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

	STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths (still-births excluded)	Age in Years						
			Under 1 year	1 to 4	Total under 5 years	5 to 9	10 to 14	15 to 19	Total 5 to 19
96	ESSEX COUNTY	**595**	**87**	**22**	**109**	**7**	**6**	**15**	**28**
97	Port Henry	45	11	2	13	.....	1	.....	1
98	Ticonderoga	27	.....	.....	.....	.....	.....	1	1
99	Other villages	137	14	1	15	.....	.....	5	5
100	Towns	386	62	19	81	7	5	9	21
101	—Raybrook Hospital for Incipient Tuberculosis	10	.....	.....	.....	.....	.....	1	1
102	FRANKLIN COUNTY	**807**	**103**	**27**	**130**	**14**	**11**	**16**	**41**
103	Malone	145	19	5	24	3	2	4	9
104	Saranac Lake*	177	4	1	5	1	1	3	5
105	Saranac Lake	241	**8**	**2**	**10**	**1**	**1**	**7**	**19**
106	Tupper Lake	36	7	4	11	2	.....	1	3
107	Other villages	34	4	.....	4	.....	.....	.....	.....
108	Towns	415	69	17	86	8	8	8	24
109	FULTON COUNTY	**700**	**72**	**20**	**92**	**12**	**9**	**4**	**25**
110	Gloversville	350	39	11	50	8	7	1	16
111	Johnstown	141	17	4	21	1	1	.....	2
112	Villages	32	2	.....	2	.....	.....	.....	.....
113	Towns	177	14	5	19	3	1	3	7
114	GENESEE COUNTY	**548**	**66**	**13**	**79**	**10**	**6**	**9**	**25**
115	Batavia	244	38	5	43	3	3	4	10
116	—State School for Blind, Batavia	.....	.....	.....	.....	.....	.....	.....	.....
117	Le Roy	43	7	2	9	3	.....	.....	3
118	Other villages	31	5	1	6	1	.....	2	3
119	Towns	230	16	5	21	3	3	3	9
120	GREENE COUNTY	**500**	**39**	**15**	**54**	**7**	**3**	**7**	**17**
121	Catskill	97	10	4	14	2	2	.....	4
122	Other villages	95	13	2	15	1	.....	1	2
123	Towns	308	16	9	25	4	1	6	11
124	HAMILTON COUNTY	**42**	**3**	**1**	**4**	**1**	.....	.....	**1**
125	Towns	42	3	1	4	1	.....	.....	1
126	HERKIMER COUNTY	**1,034**	**149**	**43**	**192**	**17**	**8**	**14**	**39**
127	Little Falls	230	42	12	54	4	2	7	13
128	Dolgeville	55	7	3	10	1	1	.....	2
129	Frankfort	51	15	6	21	2	.....	.....	2
130	Herkimer	153	26	10	36	6	1	4	11
131	Ilion	139	13	1	14	2	2	1	5
132	Mohawk	34	4	1	5	.....	.....	.....	.....
133	Other villages	52	5	1	6	1	.....	.....	1
134	Towns	320	37	9	46	1	2	2	5
135	JEFFERSON COUNTY	**1,346**	**178**	**58**	**236**	**14**	**12**	**20**	**46**
136	Watertown	558	86	27	113	9	6	12	27
137	Carthage	62	14	2	16	1	.....	.....	1
138	Other villages	281	27	12	39	2	4	4	10
139	Towns	445	51	17	68	2	2	4	8
140	LEWIS COUNTY	**380**	**34**	**14**	**48**	**2**	**2**	**8**	**12**
141	Lowville	48	3	.....	3	.....	.....	.....	.....
142	Other villages	86	6	5	11	1	1	3	5
143	Towns	246	25	9	34	1	1	5	7

* Saranac Lake village is located in two counties, Essex and Franklin. This total represents black face type.

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

STATE AND SUBDIVISIONS, BY COUNTIES	AGE IN YEARS						
	20 to 29	30 to 39	40 to 49	Total 20 to 49	50 to 59	60 and over	Unknown
96 ESSEX COUNTY	59	64	55	178	50	229	1
97 Port Henry	7	2	5	14	.....	17	.....
98 Ticonderoga	1	3	2	6	5	15	.....
99 Other villages	24	22	21	67	9	41	.....
100 Towns	27	37	27	91	36	156	1
101 —Raybrook Hospital for Incipient Tuberculosis	4	4	1	9	.....	.....	.....
102 FRANKLIN COUNTY	108	78	74	260	67	307	2
103 Malone	13	9	15	37	20	55	.....
104 Saranac Lake*	60	45	28	133	14	20	.....
105 Saranac Lake	79	61	39	179	16	27	.....
106 Tupper Lake	2	3	4	9	6	7	.....
107 Other villages	4	.....	.....	4	3	23	.....
108 Towns	29	21	27	77	24	202	2
109 FULTON COUNTY	28	43	58	129	83	371	.....
110 Gloversville	20	26	38	84	39	161	.....
111 Johnstown	4	6	12	22	22	74	.....
112 Villages	.....	1	3	4	6	20	.....
113 Towns	4	10	5	19	16	116	.....
114 GENESEE COUNTY	27	31	40	98	62	284	.....
115 Batavia	8	19	23	60	33	98	.....
116 —State School for Blind, Batavia	.....	.....	.....	.....	.....	.....	.....
117 LeRoy	.....	.....	2	2	3	26	.....
118 Other villages	.....	2	2	4	.....	18	.....
119 Towns	9	10	13	32	26	142	.....
120 GREENE COUNTY	24	19	38	81	44	302	2
121 Catskill	8	5	5	18	9	52	.....
122 Other villages	5	4	8	17	9	51	1
123 Towns	11	10	25	46	26	199	1
124 HAMILTON COUNTY	1	6	2	9	3	25	.....
125 Towns	1	6	2	9	3	25	.....
126 HERKIMER COUNTY	61	85	80	226	119	455	3
127 Little Falls	16	28	18	62	27	73	1
128 Dolgeville	5	2	2	9	10	24	.....
129 Frankfort	1	3	3	7	5	16	.....
130 Herkimer	7	11	10	28	14	62	2
131 Ilion	15	18	14	47	20	53	.....
132 Mohawk	2	2	1	5	5	19	.....
133 Other villages	3	3	2	8	6	31	.....
134 Towns	12	18	30	60	32	177	.....
135 JEFFERSON COUNTY	65	64	110	239	132	693	.....
136 Watertown	37	41	61	139	61	218	.....
137 Carthage	1	4	4	9	4	32	.....
138 Other villages	12	5	19	36	23	173	.....
139 Towns	15	14	26	55	44	270	.....
140 LEWIS COUNTY	13	21	21	55	37	228	.....
141 Lowville	1	1	2	4	6	35	.....
142 Other villages	4	2	6	12	8	50	.....
143 Towns	8	18	13	39	23	143	.....

that part of the village located in Franklin county. The total for the entire village is shown in

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

	STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths all causes (still-births excluded)	Typhoid fever (1)	Smallpox (5)	Measles (6)	Scarlet fever (7)	Whooping cough (8)	Diphtheria (9)	Influenza (10)	Tuberculosis (all forms) (28-35)
96	ESSEX COUNTY	**595**	**3**	....	....	....	**1**	**1**	**18**	**95**
97	Port Henry	45	....	....	....	....	....	....	1	3
98	Ticonderoga	27	....	....	....	....	....	....	1	3
99	Other villages	137	....	....	....	....	....	....	....	54
100	Towns	386	3	....	....	....	1	1	16	35
101	—Ray Brook Hospital for Incipient Tuberculosis	10	1	....	....	....	....	....	....	8
102	FRANKLIN COUNTY	**807**	**8**	....	**3**	**1**	**8**	**7**	**15**	**208**
103	Malone	145	5	....	....	....	1	2	3	15
104	Saranac Lake*	177	....	....	1	1	....	....	....	143
105	Saranac Lake	**241**	....	....	**1**	**1**	....	....	....	**190**
106	Tupper Lake	36	....	....	....	....	....	3	1	3
107	Other villages	34	....	....	....	....	....	....	1	3
108	Towns	415	3	....	2	....	7	2	10	44
109	FULTON COUNTY	**700**	**1**	....	....	....	**6**	**7**	**16**	**44**
110	Gloversville	350	1	....	....	....	3	6	3	17
111	Johnstown	141	....	....	....	....	1	....	3	9
112	Villages	32	....	....	....	....	....	....	1	2
113	Towns	177	....	....	....	....	2	1	9	16
114	GENESEE COUNTY	**548**	**3**	....	**2**	....	**1**	**3**	**15**	**15**
115	Batavia	244	1	....	....	....	1	1	8	9
116	—State School for Blind, Batavia	....	....	....	....	....	....	....	....	....
117	LeRoy	43	2	....	1	....	....	....	1	....
118	Other villages	31	....	....	....	....	....	....	....	....
119	Towns	230	....	....	1	....	....	2	6	6
120	GREENE COUNTY	**500**	**3**	....	....	....	**3**	**1**	**12**	**43**
121	Catskill	97	1	....	....	....	....	....	2	4
122	Other villages	95	....	....	....	....	....	....	2	11
123	Towns	308	2	....	....	....	3	1	8	28
124	HAMILTON COUNTY	**42**	....	....	....	....	....	**1**	**2**	**3**
125	Towns	42	....	....	....	....	....	1	2	3
126	HERKIMER COUNTY	**1,034**	**4**	....	**7**	**1**	**4**	**8**	**13**	**69**
127	Little Falls	230	4	....	1	....	1	1	6	12
128	Dolgeville	55	....	....	....	....	1	5	....	3
129	Frankfort	51	....	....	....	....	....	....	....	3
130	Herkimer	153	....	....	1	1	1	....	....	14
131	Ilion	139	....	....	3	....	....	....	4	11
132	Mohawk	34	....	....	1	....	....	....	....	2
133	Other villages	52	....	....	1	....	....	....	....	5
134	Towns	320	....	....	....	....	1	2	3	19
135	JEFFERSON COUNTY	**1,346**	**7**	....	**2**	....	**25**	**4**	**26**	**62**
136	Watertown	558	3	....	....	....	16	....	8	34
137	Carthage	62	....	....	....	....	....	1	1	1
138	Other villages	281	2	....	1	....	4	2	7	12
139	Towns	445	2	....	1	....	5	1	10	15
140	LEWIS COUNTY	**380**	**3**	....	**2**	**1**	**2**	....	**19**	**13**
141	Lowville	48	....	....	....	....	....	....	2	1
142	Other villages	86	....	....	....	1	....	....	5	6
143	Towns	246	3	....	2	....	2	....	12	6

* Saranac Lake, village is located in two counties, Essex and Franklin. This total represents black face type.

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH														
Pulmonary tuberculosis (28–29)	Tuberculous meningitis (30)	Other forms of tuberculosis (31-35)	Cancer (39-45)	Diabetes (50)	Cerebrospinal meningitis (61b,c)	Acute anterior poliomyelitis (63a)	Apoplexy and cerebral hemorrhage (64)	Organic heart disease (79)	Arteriosclerosis (81)	Bronchitis (89, 90)	Pneumonia (all forms) (91, 92)	Bronchopneumonia (91)	Lobar pneumonia and unqualified (92)	
89	3	3	30	3	5	.....	39	89	16	6	49	20	29	96
3	.....	.....	1	.....	2	.....	2	7	.....	.....	3	.....	3	97
3	.....	.....	2	.....	.....	.....	1	4	.....	1	1	.....	1	98
52	1	1	8	1	1	.....	11	13	4	.....	9	6	3	99
31	2	2	19	2	2	.....	25	65	12	5	36	14	22	100
8	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	101
197	8	3	36	9	1	.....	47	87	15	12	76	26	50	102
10	4	1	6	4	.....	.....	10	21	1	3	22	5	17	103
142	1	.....	1	.....	.....	.....	3	11	.....	.....	2	2	.....	104
186	2	.....	2	.....	.....	.....	4	12	2	.....	.....	4	.....	105
3	.....	.....	3	1	.....	.....	1	5	.....	.....	1	1	.....	106
3	.....	.....	2	.....	.....	.....	2	3	2	.....	4	1	3	107
39	3	2	24	4	1	.....	31	47	12	9	47	17	30	108
36	3	5	57	17	1	2	66	118	19	10	53	18	35	109
14	1	2	26	7	1	1	35	57	6	4	25	9	16	110
4	2	3	13	6	.....	.....	12	21	6	2	7	2	5	111
2	.....	.....	6	2	.....	.....	3	3	2	.....	6	1	5	112
16	.....	.....	12	2	.....	1	16	37	5	4	15	6	9	113
13	.....	2	28	9	3	1	32	88	19	7	51	18	33	114
9	.....	.....	10	2	1	.....	12	31	5	1	19	5	14	115
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	116
.....	.....	.....	2	1	1	.....	.....	5	4	1	6	1	5	117
.....	.....	.....	1	1	.....	.....	1	9	1	.....	4	2	2	118
4	.....	2	15	5	1	1	19	43	9	5	22	10	12	119
36	2	5	34	5	3	.....	73	71	17	9	32	12	20	120
4	.....	.....	7	2	2	.....	17	12	4	2	5	1	4	121
10	1	.....	4	1	.....	.....	12	14	1	2	5	4	1	122
22	1	5	23	2	1	.....	44	45	12	5	22	7	15	123
3	.....	.....	3	1	.....	.....	2	4	.....	.....	2	.....	2	124
3	.....	.....	3	1	.....	.....	2	4	.....	.....	2	.....	2	125
53	10	6	65	11	.....	.....	81	144	16	12	117	44	73	126
8	3	1	12	1	.....	.....	16	24	1	1	17	6	11	127
2	.....	1	6	.....	.....	.....	5	7	.....	.....	7	2	5	128
1	2	.....	2	1	.....	.....	2	4	2	.....	15	8	7	129
10	3	1	11	3	.....	.....	6	21	3	3	16	4	12	130
9	1	1	9	2	.....	.....	6	20	.....	.....	14	5	9	131
2	.....	.....	3	.....	.....	.....	3	4	1	.....	3	1	2	132
5	.....	.....	4	1	.....	.....	4	7	4	1	6	3	3	133
16	1	2	18	3	.....	.....	39	57	5	7	39	15	24	134
46	8	8	75	23	4	1	119	199	46	29	124	36	88	135
25	4	5	33	10	2	1	34	60	17	9	55	14	41	136
1	.....	.....	3	1	.....	.....	4	10	2	1	5	4	1	137
7	2	3	11	1	1	.....	30	50	14	4	28	8	20	138
13	2	.....	28	11	1	.....	51	79	13	6	36	10	26	139
10	.....	3	24	6	2	.....	44	69	5	5	40	11	29	140
.....	.....	1	5	1	.....	.....	4	16	.....	2	4	1	3	141
5	.....	1	2	1	1	.....	15	16	.....	1	10	2	8	142
5	.....	1	17	4	1	.....	25	37	5	2	26	8	18	143

that part of the village located in Franklin county. The total for the entire village is shown in

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

STATE AND SUBDIVISIONS, BY COUNTIES	Diarrhea and enteritis (under 2 years) (104)	Appendicitis (108)	Hernia, intestinal obstruction (109)	Cirrhosis of liver (113)	Nephritis and Bright's disease (119, 120)	Puerperal septicemia (137)	Other puerperal affections (134-136, 138-141)	Total diseases peculiar to early infancy (150-153)	Congenital malformations (150)
96 ESSEX COUNTY	**30**	**2**	**6**	**3**	**19**	**3**	**4**	**43**	**6**
97 Port Henry	5	.....	.....	1	1	1	1	7	.....
98 Ticonderoga	.....	.....	1	.....	2	.....	.....	.....	.....
99 Other villages	2	1	.....	.....	3	.....	2	10	3
100 Towns	23	1	5	2	13	2	1	26	3
101 —Raybrook Hospital for Incipient Tuberculosis	.....	.....	.....	.....	.....	.....	.....	.....	.....
102 FRANKLIN COUNTY	**15**	**4**	**4**	**4**	**52**	**1**	**5**	**52**	**11**
103 Malone	3	4	2	1	10	.....	2	9	1
104 Saranac Lake*	.....	.....	.....	.....	4	.....	.....	3	.....
105 Saranac Lake	.....	1	.....	.....	6	.....	.....	.....	.....
106 Tupper Lake	1	.....	1	.....	6	.....	.....	4	.....
107 Other villages	2	.....	1	.....	3	.....	.....	1	1
108 Towns	9	.....	.....	3	29	1	3	35	9
109 FULTON COUNTY	**8**	**6**	**7**	**4**	**81**	**2**	**3**	**39**	**9**
110 Gloversville	6	5	7	3	35	.....	3	22	7
111 Johnstown	2	.....	.....	.....	23	1	.....	11	2
112 Villages	.....	.....	.....	.....	.....	.....	.....	1	.....
113 Towns	.....	1	.....	1	23	1	.....	5	.....
114 GENESEE COUNTY	**14**	**1**	**5**	**5**	**45**	**2**	**4**	**34**	**6**
115 Batavia	8	1	4	2	19	1	2	22	4
116 —State School for Blind, Batavia	.....	.....	.....	.....	.....	.....	.....	.....	.....
117 LeRoy	2	.....	.....	.....	3	.....	.....	1	.....
118 Other villages	1	.....	.....	.....	4	.....	.....	2	1
119 Towns	3	.....	1	3	19	1	2	9	1
120 GREENE COUNTY	**10**	.....	**6**	**3**	**54**	**1**	**4**	**15**	**1**
121 Catskill	4	.....	.....	.....	13	1	2	6	1
122 Other villages	1	.....	.....	1	13	.....	.....	6	.....
123 Towns	5	.....	6	2	28	.....	2	3	.....
124 HAMILTON COUNTY	.....	.....	.....	.....	**8**	.....	.....	**2**	**1**
125 Towns	.....	.....	.....	.....	8	.....	.....	2	1
126 HERKIMER COUNTY	**40**	**9**	**6**	**11**	**112**	**5**	**7**	**70**	**11**
127 Little Falls	15	3	3	3	25	2	4	17	6
128 Dolgeville	2	.....	.....	.....	8	1	.....	1	.....
129 Frankfort	3	.....	.....	.....	1	.....	.....	8	1
130 Herkimer	9	3	.....	2	18	1	1	12	1
131 Ilion	1	3	1	2	22	.....	2	10	1
132 Mohawk	.....	.....	1	.....	8	.....	.....	3	.....
133 Other villages	.....	.....	.....	2	3	.....	.....	1	.....
134 Towns	10	.....	1	2	27	1	.....	18	2
135 JEFFERSON COUNTY	**32**	**14**	**8**	**11**	**92**	**6**	**11**	**86**	**17**
136 Watertown	21	10	2	6	35	5	9	40	8
137 Carthage	2	.....	.....	2	7	.....	.....	5	.....
138 Other villages	5	1	.....	.....	18	1	.....	12	2
139 Towns	4	3	6	3	32	.....	2	29	7
140 LEWIS COUNTY	**3**	**1**	**4**	**1**	**33**	**1**	**1**	**19**	**7**
141 Lowville	1	.....	.....	1	2	.....	.....	2	.....
142 Other villages	1	.....	2	.....	6	.....	.....	3	1
143 Towns	1	1	2	.....	25	1	1	14	6

* Saranac Lake, village is located in two counties, Essex and Franklin. This total represents black face type.

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH — *Concluded*

Premature birth (151a)	Congenital debility (151b)	Other causes peculiar to early infancy (152-153)	Old age (154)	Total accidents (164-181, 185-186)	Railroad accidents (175a)	Automobile accidents (175c)	Drowning (169)	Other accidents	Suicides (155-163)	Homicides (182-184)	All other causes	
19	**11**	**7**	**4**	**26**	**2**	**5**	**2**	**17**	**3**	**1**	**96**	93
6	.....	1	e.....	3	1	.....	.....	2	.....	.....	7	97
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	98
2	3	2	1	1	.....	1	.....	.....	2	.....	14	99
11	8	4	3	22	1	4	2	15	1	1	64	100
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	101
22	**16**	**3**	**11**	**31**	**1**	**3**	**9**	**18**	**3**	.....	**92**	102
5	3	.....	.....	3	.....	.....	.....	3	1	.....	17	103
1	2	.....	1	4	.....	.....	2	2	.....	.....	3	104
2	**3**	**1**	**2**	.....	.....	.....	.....	**3**	.....	.....	**7**	105
2	1	1	1	1	.....	.....	1	.....	.....	.....	4	106
.....	.....	.....	2	1	.....	.....	.....	1	.....	.....	7	107
14	10	2	7	22	1	3	6	12	2	.....	61	108
20	**5**	**5**	**4**	**27**	.....	**3**	**1**	**23**	**6**	**2**	**94**	109
13	1	1	1	17	.....	2	1	14	3	2	54	110
4	3	2	.....	5	.....	1	.....	4	1	.....	18	111
.....	.....	1	1	1	.....	.....	.....	1	.....	.....	4	112
3	1	1	2	4	.....	.....	.....	4	2	.....	18	113
20	**4**	**4**	**5**	**41**	**17**	**2**	**1**	**21**	**9**	**3**	**103**	114
13	3	2	3	17	6	.....	.....	11	3	2	59	115
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	116
.....	.....	1	.....	3	1	.....	.....	2	.....	.....	10	117
1	.....	.....	.....	2	2	.....	.....	.....	2	.....	3	118
6	1	1	2	19	8	2	1	8	4	1	31	119
9	**2**	**3**	**2**	26	3	1	10	12	5	.....	68	120
5	.....	.....	.....	5	.....	.....	3	2	1	.....	7	121
3	1	2	.....	6	2	.....	2	2	.....	.....	16	122
1	1	1	2	15	1	1	5	8	4	.....	45	123
1	.....	.....	**2**	5	.....	1	1	3	1	.....	6	124
1	.....	.....	2	5	.....	1	1	3	1	.....	6	125
36	**9**	**14**	**11**	**82**	**16**	**11**	**10**	**45**	**5**	**4**	**120**	126
9	.....	2	4	30	6	4	2	18	.....	1	26	127
1	.....	.....	.....	1	.....	.....	.....	1	1	.....	7	128
5	.....	2	1	2	1	.....	1	.....	1	.....	6	129
5	2	4	1	10	4	2	1	3	.....	1	15	130
5	1	3	.....	11	1	3	.....	7	.....	.....	18	131
2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	132
.....	1	.....	1	3	.....	.....	1	2	.....	.....	9	133
9	4	3	4	25	4	2	5	14	3	2	34	134
52	**11**	**6**	**31**	**81**	**8**	**10**	**13**	**59**	**15**	**3**	**219**	135
26	4	2	5	37	5	6	2	24	7	3	96	136
4	.....	1	2	2	.....	1	1	.....	.....	.....	13	137
8	1	1	7	14	.....	1	5	8	4	.....	52	138
14	6	2	17	28	3	2	5	18	4	.....	58	139
5	**6**	**1**	**13**	**10**	**2**	**1**	**1**	**6**	**4**	.....	**55**	140
.....	2	.....	2	1	1	.....	.....	.....	1	.....	3	141
1	.....	1	1	1	.....	.....	1	.....	1	.....	13	142
4	4	.....	10	8	1	1	.....	6	2	.....	39	143

that part of the village located in Franklin county. The total for the entire village is shown in

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

	STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths (still-births excluded)	Age in Years						
			Under 1 year	1 to 4	Total under 5 years	5 to 9	10 to 14	15 to 19	Total 5 to 19
144	LIVINGSTON COUNTY	**693**	**48**	**20**	**68**	**6**	**9**	**23**	**38**
145	Dansville	65	7	1	8	.....	.....	1	1
146	Mount Morris	58	8	7	15	1	.....	2	3
147	Other villages	125	12	2	14	1	2	.....	3
148	Towns	445	21	10	31	4	7	20	31
149	—Craig Colony, Sonyea	154	.....	.....	.....	.....	4	17	21
150	MADISON COUNTY	**666**	**58**	**17**	**75**	**6**	**4**	**3**	**13**
151	Oneida	170	11	5	16	4	1	2	7
152	Canastota	58	11	3	14	.....	.....	.....	.....
153	Other villages	114	8	1	9	.....	.....	.....	.....
154	Towns	324	28	8	36	2	3	1	6
155	MONROE COUNTY	**4,993**	**679**	**306**	**985**	**78**	**49**	**77**	**204**
156	Rochester	4,088	581	284	865	65	38	55	158
157	—Rochester State Hospital	221	.....	.....	.....	.....	.....	1	1
158	Brockport	44	4	.....	4	.....	.....	.....	.....
159	East Rochester	26	8	.....	8	3	.....	1	4
160	Fairport	53	4	3	7	1	.....	.....	1
161	Other villages	72	7	5	12	1	2	3	6
162	Towns	710	75	14	89	8	9	18	35
163	MONTGOMERY COUNTY	**886**	**126**	**45**	**171**	**17**	**13**	**13**	**43**
164	Amsterdam	485	89	28	117	8	8	7	23
165	Fort Plain	56	4	3	7	.....	.....	2	2
166	St. Johnsville	42	7	5	12	3	1	.....	4
167	Other villages	96	11	5	16	1	1	1	3
168	Towns	207	15	4	19	5	3	3	11
169	NASSAU COUNTY	**1,444**	**240**	**84**	**324**	**34**	**14**	**33**	**81**
170	Cedarhurst	14	1	.....	1	.....	.....	1	1
171	Freeport	81	8	1	9	3	1	1	5
172	Hempstead	65	8	2	10	1	.....	.....	1
173	Lynbrook	36	4	4	8	.....	.....	.....	.....
174	Rockville Center	69	7	4	11	2	.....	1	3
175	Other villages	297	30	12	42	9	3	9	21
176	Towns	882	182	61	243	19	10	21	50
177	NIAGARA COUNTY	**1,713**	**333**	**94**	**427**	**27**	**16**	**33**	**76**
178	Lockport	331	36	16	52	2	3	4	9
179	Niagara Falls	719	206	52	258	19	5	15	39
180	North Tonawanda	210	59	11	70	3	1	6	10
181	Villages	88	9	1	10	2	.....	.....	2
182	Towns	365	23	14	37	1	7	8	16
183	ONEIDA COUNTY	**3,140**	**444**	**162**	**606**	**64**	**45**	**60**	**169**
184	Rome	676	76	38	114	14	18	24	56
185	—Rome Custodial Asylum	85	1	5	6	9	14	12	35
186	Utica	1,577	259	85	344	40	16	25	81
187	—Utica State Hospital	145	1	.....	1	.....	.....	.....	.....
188	Sherrill	8	2	.....	2	.....	.....	.....	.....
189	Villages	288	27	10	37	5	2	3	10
190	Towns	591	80	29	109	5	9	8	22

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

STATE AND SUBDIVISIONS, BY COUNTIES	Age in Years						
	20 to 29	30 to 39	40 to 49	Total 20 to 49	50 to 59	60 and over	Unknown
144 LIVINGSTON COUNTY	60	65	60	185	58	344	.....
145 Dansville	2	2	5	9	11	36	.....
146 Mount Morris	3	2	3	8	8	24	.....
147 Other villages	4	7	7	18	8	82	.....
148 Towns	51	54	45	150	31	202	.....
149 —Craig Colony, Sonyea	37	43	24	104	15	14	.....
150 MADISON COUNTY	13	30	49	92	73	413	.....
151 Oneida	6	7	16	29	23	95	.....
152 Canastota	.....	3	2	5	8	31	.....
153 Other villages	1	6	4	11	10	84	.....
154 Towns	6	14	27	47	32	203	.....
155 MONROE COUNTY	299	368	509	1,167	696	1,941	.....
156 Rochester	228	288	422	938	593	1,534	.....
157 —Rochester State Hospital	5	21	35	61	45	114	.....
158 Brockport	.....	2	3	5	5	30	.....
159 East Rochester	2	1	1	4	5	5	.....
160 Fairport	3	.....	4	7	8	30	.....
161 Other villages	.....	4	5	9	5	40	.....
162 Towns	66	73	65	204	80	302	.....
163 MONTGOMERY COUNTY	59	61	64	184	103	381	4
164 Amsterdam	33	43	39	115	60	167	3
165 Fort Plain	4	1	3	8	5	34	.....
166 St. Johnsville	2	4	.....	6	7	13	.....
167 Other villages	4	3	10	17	13	47	.....
168 Towns	16	10	12	38	18	120	1
169 NASSAU COUNTY	78	99	136	313	175	549	2
170 Cedarhurst	.....	1	1	2	2	8	.....
171 Freeport	2	5	9	16	14	37	.....
172 Hempstead	7	5	6	18	4	31	1
173 Lynbrook	2	1	1	4	6	18	.....
174 Rockville Center	2	3	8	13	7	35	.....
175 Other villages	21	36	36	93	44	96	1
176 Towns	44	48	75	167	98	324	.....
177 NIAGARA COUNTY	110	148	167	425	177	604	4
178 Lockport	15	25	39	79	38	153	.....
179 Niagara Falls	64	73	75	212	75	135	.....
180 North Tonawanda	11	26	24	61	18	51	.....
181 Villages	6	2	5	13	6	57	.....
182 Towns	14	22	24	60	40	208	4
183 ONEIDA COUNTY	198	222	278	698	311	1,355	1
184 Rome	71	52	64	187	71	248	.....
185 —Rome Custodial Asylum	22	7	7	36	4	4	.....
186 Utica	89	134	165	388	164	600	.....
187 —Utica State Hospital	10	16	17	43	25	76	.....
188 Sherrill	.....	.....	1	1	1	4	.....
189 Villages	8	11	15	34	18	189	.....
190 Towns	30	25	33	88	57	314	1

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

	STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths all causes (still-births excluded)	Typhoid fever (1)	Smallpox (5)	Measles (6)	Scarlet fever (7)	Whooping cough (8)	Diphtheria (9)	Influenza (10)	Tuberculosis (all forms) (28-35)
144	LIVINGSTON COUNTY	**693**	**1**	....	**3**	....	**2**	.....	**10**	**65**
145	Dansville	65	....	....	....	....	....	.....	.....	.....
146	Mount Morris	58	....	....	1	....	....	.....	1	2
147	Other villages	125	....	....	....	....	1	.....	3	5
148	Towns	445	1	....	2	....	1	.....	6	58
149	—Craig Colony, Sonyea	154	....	....	1	....	....	.....	.....	41
150	MADISON COUNTY	**666**	**2**	....	**1**	....	**1**	**4**	**14**	**32**
151	Oneida	170	....	....	....	....	....	2	2	7
152	Canastota	58	....	....	....	....	....	.....	2	2
153	Other villages	114	1	....	1	....	....	.....	1	5
154	Towns	324	1	....	....	....	1	2	9	18
155	MONROE COUNTY	**4,993**	**9**	....	**39**	**39**	**20**	**59**	**26**	**468**
156	Rochester	4,088	8	....	36	36	18	53	13	317
157	—Rochester State Hospital	221	....	....	....	....	....	.....	.....	21
158	Brockport	44	....	....	....	....	....	.....	.....	2
159	East Rochester	26	....	....	....	....	....	1	.....	1
160	Fairport	53	....	....	1	....	....	.....	.....	4
161	Other villages	72	....	....	....	1	....	.....	1	1
162	Towns	710	1	....	2	2	2	5	12	143
163	MONTGOMERY COUNTY	**886**	**1**	....	**2**	....	**1**	**5**	**9**	**89**
164	Amsterdam	485	....	....	1	....	....	3	2	42
165	Fort Plain	56	....	....	....	....	....	.....	1	5
166	St. Johnsville	42	....	....	....	....	1	.....	1	5
167	Other villages	96	1	....	....	....	....	1	4	6
168	Towns	207	....	....	1	....	....	1	1	31
169	NASSAU COUNTY	**1,444**	**1**	....	**13**	**1**	**7**	**18**	**23**	**93**
170	Cedarhurst	14	....	....	....	....	....	.....	.....	.....
171	Freeport	81	....	....	....	....	....	1	.....	5
172	Hempstead	65	....	....	....	....	....	1	2	2
173	Lynbrook	36	....	....	....	....	....	1	.....	2
174	Rockville Center	69	....	....	....	....	1	1	3	7
175	Other villages	297	1	....	4	....	....	2	3	17
176	Towns	882	....	....	9	1	6	12	15	60
177	NIAGARA COUNTY	**1,713**	**15**	....	**7**	**2**	**11**	**6**	**22**	**118**
178	Lockport	331	6	....	1	....	....	2	3	30
179	Niagara Falls	719	5	....	4	....	5	4	2	49
180	North Tonawanda	210	2	....	....	....	4	.....	.....	17
181	Villages	88	....	....	....	....	1	.....	2	4
182	Towns	365	2	....	2	2	1	.....	15	18
183	ONEIDA COUNTY	**3,140**	**18**	....	**29**	**1**	**14**	**18**	**26**	**296**
184	Rome	676	3	....	11	....	....	2	4	129
185	—Rome Custodial Asylum	85	1	....	6	....	....	.....	.....	37
186	Utica	1,577	11	....	6	1	12	10	6	116
187	—Utica State Hospital	145	....	....	....	....	....	.....	.....	16
188	Sherrill	8	....	....	....	....	....	.....	.....	.....
189	Villages	288	1	....	2	....	2	.....	5	15
190	Towns	591	3	....	10	....	....	6	11	36

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH														
Pulmonary tuberculosis (28–29)	Tuberculous meningitis (30)	Other forms of tuberculosis (31-35)	Cancer (39-45)	Diabetes (50)	Cerebrospinal meningitis (61 b, c)	Acute anterior poliomyelitis (63a)	Apoplexy and cerebral hemorrhage (64)	Organic heart disease (79)	Arteriosclerosis (81)	Bronchitis (89, 90)	Pneumonia (all forms) (91, 92)	Bronchopneumonia (91)	Lobar pneumonia and unqualified (92)	
58	.....	7	45	12	.....	.....	49	133	10	8	69	29	40	144
.....	.....	.....	4	5	.....	.....	5	15	1	.....	3	2	1	145
1	.....	1	1	.....	.....	.....	3	15	.....	2	9	7	2	146
5	.....	.....	10	3	.....	.....	17	27	5	3	9	2	7	147
52	.....	6	30	4	.....	.....	24	76	4	3	48	18	30	148
38	.....	3	1	.....	.....	.....	2	12	.....	1	24	10	14	149
27	3	2	55	23	.....	.....	69	134	16	5	65	13	52	150
5	1	1	13	3	.....	.....	17	38	4	1	19	4	15	151
2	.....	.....	6	2	.....	.....	4	13	1	.....	6	3	3	152
5	.....	.....	12	4	.....	.....	11	20	3	1	7	.....	7	153
15	2	1	24	14	.....	.....	37	63	8	3	33	6	27	154
399	32	37	373	91	11	.....	375	696	98	52	464	195	269	155
254	30	33	314	79	10	.....	303	579	80	38	411	174	237	156
16	1	4	4	.....	.....	.....	14	45	15	1	52	34	18	157
2	.....	.....	7	1	.....	.....	6	4	1	.....	5	3	2	158
1	.....	.....	1	.....	.....	.....	1	2	.....	1	4	2	2	159
2	1	1	6	1	1	.....	4	7	.....	3	1	.....	1	160
1	.....	.....	9	1	.....	.....	5	11	2	.....	10	4	6	161
139	1	3	36	9	.....	.....	56	93	15	10	33	12	21	162
79	4	6	55	5	2	.....	64	145	25	12	90	36	54	163
35	3	4	27	3	1	.....	30	70	11	4	54	25	29	164
5	.....	.....	4	.....	1	.....	8	16	1	.....	5	2	3	165
5	.....	.....	4	.....	.....	.....	3	5	.....	1	8	4	4	166
5	.....	1	7	.....	.....	.....	8	16	3	1	8	2	6	167
29	1	1	13	2	.....	.....	15	38	10	6	15	3	12	168
79	11	3	85	19	2	1	90	200	32	19	170	54	116	169
.....	.....	.....	1	1	.....	.....	1	5	.....	.....	1	.....	1	170
5	.....	.....	5	2	.....	.....	8	14	1	2	9	1	8	171
2	.....	.....	1	1	.....	.....	7	14	4	1	6	4	2	172
2	.....	.....	1	.....	.....	.....	8	4	1	.....	8	1	7	173
6	1	.....	5	.....	.....	.....	2	11	5	.....	9	4	5	174
14	1	2	12	4	.....	1	14	36	7	2	28	5	23	175
50	9	1	60	11	2	.....	50	116	14	14	109	39	70	176
95	10	13	94	26	6	.....	97	224	25	17	188	72	116	177
27	1	2	25	2	.....	.....	33	59	9	2	36	8	28	178
35	7	7	28	6	5	.....	21	64	9	2	91	38	53	179
15	1	1	14	6	1	.....	9	15	1	8	20	9	11	180
4	.....	.....	5	3	.....	.....	6	16	3	2	11	2	9	181
14	1	3	22	9	.....	.....	28	70	3	3	30	15	15	182
259	15	22	168	47	4	1	226	468	74	56	367	161	206	183
122	.....	7	27	11	.....	1	41	86	13	16	54	28	26	184
37	.....	.....	1	.....	.....	.....	3	2	.....	1	12	7	5	185
90	12	14	95	21	3	.....	100	238	33	24	202	88	114	186
16	.....	.....	4	.....	.....	.....	13	31	4	.....	12	4	8	187
.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	3	.....	3	188
13	2	.....	18	5	1	.....	30	49	5	5	35	12	23	189
34	1	1	28	10	.....	.....	55	93	23	11	73	33	40	190

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

	STATE AND SUBDIVISIONS, BY COUNTIES	Diarrhea and enteritis (under 2 years) (104)	Appendicitis (108)	Hernia, intestinal obstruction (109)	Cirrhosis of liver (113)	Nephritis and Bright's disease (119, 120)	Puerperal septicemia (137)	Other puerperal affections (134-136, 138-141)	Total diseases peculiar to early infancy (150-153)	Congenital malformations (150)
144	LIVINGSTON COUNTY	**8**	**3**	**4**	**4**	**44**	**2**	**3**	**19**	**1**
145	Dansville	.....	.....	1	.....	8	.....	1	5	1
146	Mount Morris	4	.....	.....	.....	1	.....	1	1	.....
147	Other villages	2	.....	1	.....	9	1	.....	3	.....
148	Towns	2	3	2	4	26	1	1	10	.....
149	—Craig Colony, Sonyea	.....	1	.....	1	5	.....	.....	.....	.....
150	MADISON COUNTY	**8**	**2**	**5**	**5**	**46**	**1**	**2**	**32**	**6**
151	Oneida	5	2	2	1	7	.....	1	4	.....
152	Canastota	1	.....	1	.....	1	.....	.....	2	.....
153	Other villages	.....	.....	.....	2	14	.....	.....	6	2
154	Towns	2	.....	2	2	24	1	1	20	4
155	MONROE COUNTY	**206**	**48**	**38**	**56**	**457**	**19**	**22**	**309**	**51**
156	Rochester	185	45	30	47	390	17	21	260	34
157	—Rochester State Hospital	.....	.....	1	1	7	.....	.....	.....	.....
158	Brockport	.....	.....	.....	1	4	.....	.....	4	2
159	East Rochester	.....	.....	.....	1	4	1	.....	3	1
160	Fairport	.....	.....	1	.....	3	.....	.....	2	.....
161	Other villages	4	.....	.....	.....	2	.....	.....	.....	.....
162	Towns	17	3	7	7	54	1	1	40	14
163	MONTGOMERY COUNTY	**42**	**9**	**7**	**8**	**67**	**4**	**6**	**50**	**8**
164	Amsterdam	31	8	4	5	29	4	6	38	5
165	Fort Plain	1	.....	1	.....	5	.....	.....	1	.....
166	St. Johnsville	3	.....	1	.....	4	.....	.....	1	1
167	Other villages	3	1	1	1	8	.....	.....	3	1
168	Towns	4	.....	.....	2	21	.....	.....	7	1
169	NASSAU COUNTY	**68**	**10**	**12**	**16**	**117**	**6**	**6**	**99**	**21**
170	Cedarhurst	1	.....	.....	.....	1	.....	.....	.....	.....
171	Freeport	2	1	1	1	5	.....	1	4	.....
172	Hempstead	4	.....	.....	1	11	.....	.....	2	2
173	Lynbrook	2	.....	.....	.....	1	.....	.....	3	2
174	Rockville Center	.....	.....	.....	3	6	.....	.....	2	.....
175	Other villages	6	8	8	5	24	3	3	16	1
176	Towns	53	1	3	6	69	3	2	72	16
177	NIAGARA COUNTY	**113**	**13**	**15**	**23**	**106**	**11**	**9**	**137**	**21**
178	Lockport	9	.....	3	7	23	.....	2	20	4
179	Niagara Falls	87	6	7	9	53	6	4	71	8
180	North Tonawanda	16	4	2	1	9	2	1	24	6
181	Villages	1	1	1	.....	4	1	.....	5	.....
182	Towns	.....	2	2	6	17	2	2	17	3
183	ONEIDA COUNTY	**103**	**25**	**37**	**25**	**296**	**7**	**12**	**166**	**35**
184	Rome	25	3	5	3	74	1	5	22	4
185	—Rome Custodial Asylum	.....	.....	.....	.....	1	.....	.....	2	2
186	Utica	50	21	22	13	155	6	7	100	20
187	—Utica State Hospital	1	.....	1	.....	18	.....	.....	.....	.....
188	Sherrill	1	.....	.....	.....	.....	.....	.....	1	.....
189	Villages	6	.....	3	2	22	.....	.....	13	5
190	Towns	21	1	7	7	45	.....	.....	30	6

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH — *Concluded*

Premature birth (151a)	Congenital debility (151b)	Other causes peculiar to early infancy (152-153)	Old age (154)	Total accidents (164-181, 185-186)	Railroad accidents (175a)	Automobile accidents (175c)	Drowning (169)	Other accidents	Suicides (155-163)	Homicides (182-184)	All other causes	
8	**5**	**5**	**8**	**43**	**8**	**3**	**4**	**28**	**4**	**1**	**143**	144
3	1	.....	.....	1	.....	.....	.....	1	.....	.....	16	145
.....	.....	1	2	7	3	.....	2	2	.....	.....	8	146
1	2	.....	2	5	2	.....	1	2	.....	.....	19	147
4	2	4	4	30	3	3	1	23	4	1	100	148
.....	.....	.....	.....	4	1	.....	.....	3	2	.....	59	149
14	**7**	**5**	**9**	**29**	**7**	**2**	**2**	**18**	**7**	**1**	**98**	150
3	.....	1	4	7	2	2	.....	3	.....	.....	31	151
1	1	.....	1	6	4	.....	.....	2	1	.....	9	152
2	.....	2	.....	2	.....	.....	.....	2	1	1	22	153
8	6	2	4	14	1	.....	2	11	5	.....	36	154
184	**14**	**60**	**14**	**266**	**34**	**37**	**20**	**175**	**46**	**16**	**676**	155
159	11	56	1	196	20	26	8	142	34	10	557	156
.....	.....	.....	.....	2	.....	.....	.....	2	.....	.....	58	157
2	.....	.....	3	2	.....	.....	.....	2	.....	.....	4	158
1	.....	1	.....	1	.....	1	.....	.....	.....	.....	5	159
1	.....	1	2	4	1	.....	1	2	1	.....	12	160
.....	.....	.....	1	5	1	.....	1	3	3	.....	16	161
21	3	2	7	58	12	10	10	26	8	6	82	162
25	**5**	**12**	**9**	**54**	**11**	**3**	**11**	**29**	**5**	**3**	**117**	163
19	3	11	5	32	4	2	5	21	1	1	73	164
1	.....	.....	1	2	1	.....	.....	1	.....	.....	4	165
.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	4	166
1	1	.....	.....	6	3	.....	2	1	1	1	16	167
4	1	1	2	14	3	1	4	6	3	1	20	168
44	**15**	**19**	**6**	**141**	**10**	**27**	**22**	**82**	**12**	**5**	**172**	169
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	170
3	1	.....	1	5	.....	.....	.....	5	.....	.....	13	171
.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	7	172
1	.....	.....	.....	2	1	.....	.....	1	.....	.....	6	173
2	.....	.....	1	6	1	.....	.....	5	1	.....	3	174
9	3	3	.....	43	3	15	4	21	4	1	45	175
29	11	16	4	84	5	12	18	49	7	4	95	176
75	**28**	**13**	**13**	**138**	**17**	**20**	**16**	**85**	**16**	**7**	**254**	177
6	8	2	2	14	.....	2	1	11	3	.....	40	178
47	9	7	5	71	11	10	6	44	5	4	96	179
11	5	2	1	22	1	1	5	15	3	3	25	180
3	2	.....	1	5	3	.....	1	1	1	.....	15	181
8	4	2	4	26	2	7	3	14	4	.....	78	182
66	**25**	**40**	**17**	**183**	**29**	**20**	**25**	**109**	**30**	**2**	**424**	183
10	5	3	3	31	3	3	6	19	7	1	98	184
.....	.....	.....	.....	1	.....	.....	.....	1	1	.....	17	185
40	14	26	3	102	19	12	7	64	13	1	206	186
.....	.....	.....	.....	2	.....	.....	.....	2	3	.....	40	187
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	188
3	2	3	5	16	4	2	3	7	3	.....	45	189
13	4	7	6	34	3	3	9	19	7	.....	74	190

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age period*

	STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths (still-births excluded)	AGE IN YEARS						
			Under 1 year	1 to 4	Total under 5 years	5 to 9	10 to 14	15 to 19	Total 5 to 19
191	ONONDAGA COUNTY	**3,534**	**545**	**164**	**709**	**64**	**37**	**58**	**159**
192	Syracuse	**2,438**	**430**	**132**	**562**	**49**	**19**	**36**	**104**
193	—State Institution for Feeble Minded, Syracuse	10	.....	.....	.....	.....	2	2	4
194	Baldwinsville	44	4	.....	4	1	3	.....	4
195	East Syracuse	50	10	3	13	1	.....	1	2
196	Solvay	59	16	4	20	2	.....	.....	2
197	Other villages	168	14	4	18	5	1	.....	6
198	Towns	775	71	21	92	6	14	21	41
199	ONTARIO COUNTY	**876**	**81**	**31**	**112**	**12**	**3**	**13**	**28**
200	Canandaigua	162	7	4	11	4	.....	2	6
201	Geneva	237	34	14	48	2	.....	5	7
202	Villages	154	10	2	12	1	.....	3	4
203	Towns	323	30	11	41	5	3	3	11
204	ORANGE COUNTY	**2,100**	**233**	**71**	**304**	**33**	**16**	**25**	**74**
205	Middletown	442	25	9	34	6	3	6	15
206	—Middletown State Hospital	158	.....	.....	.....	.....	.....	.....	.....
207	Newburgh	539	54	17	71	9	3	5	17
208	Port Jervis	193	27	7	34	3	2	3	8
209	Cornwall	28	2	1	3	.....	.....	1	1
210	Goshen	50	6	1	7	3	1	2	6
211	Highland Falls	50	5	7	12	.....	.....	2	2
212	Walden	53	6	3	9	1	2	.....	3
213	Warwick	38	11	1	12	.....	.....	1	1
214	Other villages	67	6	5	11	2	.....	.....	2
215	Towns	640	91	20	111	9	5	5	19
216	ORLEANS COUNTY	**421**	**36**	**11**	**47**	**5**	**5**	**5**	**15**
217	Albion	91	7	3	10	2	2	.....	4
218	Medina	83	9	5	14	2	1	2	5
219	Other villages	43	3	2	5	.....	.....	.....	.....
220	Towns	204	17	1	18	1	2	3	6
221	OSWEGO COUNTY	**1,162**	**132**	**42**	**174**	**15**	**8**	**14**	**37**
222	Fulton	161	27	6	33	3	.....	3	6
223	Oswego	367	49	14	63	4	5	4	13
224	Villages	154	9	5	14	1	1	1	3
225	Towns	480	47	17	64	7	2	6	15
226	OTSEGO COUNTY	**780**	**64**	**9**	**73**	**5**	**5**	**8**	**18**
227	Oneonta	181	24	1	25	4	.....	1	5
228	Cooperstown	54	5	1	6	.....	1	2	3
229	Other villages	109	5	3	8	.....	.....	2	2
230	Towns	436	30	4	34	1	4	3	8
231	PUTNAM COUNTY	**164**	**25**	**6**	**31**	**2**	**4**	.....	**6**
232	Cold Spring	25	5	2	7	1	.....	.....	1
233	Other villages	20	2	1	3	.....	.....	.....	.....
234	Towns	119	18	3	21	1	4	.....	5
235	RENSSELAER COUNTY	**2,266**	**255**	**111**	**366**	**36**	**25**	**31**	**92**
236	Rensselaer	124	11	3	14	2	3	.....	5
237	Troy	1,654	201	95	296	29	19	27	75
238	Hoosick Falls	82	11	3	14	.....	.....	.....	.....
239	Other villages	53	6	1	7	.....	.....	1	1
240	Towns	353	26	9	35	5	3	3	11

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

STATE AND SUBDIVISIONS, BY COUNTIES	Age in Years						
	20 to 29	30 to 39	40 to 49	Total 20 to 49	50 to 59	60 and over	Unknown
191 ONONDAGA COUNTY	**231**	**241**	**328**	**800**	**460**	**1,405**	**1**
192 Syracuse	164	181	235	580	329	863	.....
193 —State Institution for Feeble Minded, Syracuse	4	.....	1	5	.....	1	.....
194 Baldwinsville	.....	3	2	5	5	26	.....
195 East Syracuse	3	3	6	12	3	20	.....
196 Solvay	6	2	5	13	6	18	.....
197 Other villages	5	6	9	20	20	104	.....
198 Towns	53	46	71	170	97	374	1
199 ONTARIO COUNTY	**35**	**48**	**67**	**150**	**98**	**488**	.....
200 Canandaigua	5	11	19	35	17	93	.....
201 Geneva	16	20	17	53	32	97	.....
202 Villages	4	9	12	25	18	95	.....
203 Towns	10	8	19	37	31	203	.....
204 ORANGE COUNTY	**139**	**163**	**214**	**516**	**255**	**949**	**2**
205 Middletown	26	39	53	118	74	201	.....
206 —Middletown State Hospital	4	19	23	46	38	74	.....
207 Newburgh	51	49	69	169	54	228	.....
208 Port Jervis	8	20	18	46	28	77	.....
209 Cornwall	1	2	3	6	.....	18	.....
210 Goshen	3	4	4	11	1	25	.....
211 Highland Falls	2	5	8	15	2	19	.....
212 Walden	4	4	3	11	8	22	.....
213 Warwick	1	2	2	5	3	17	.....
214 Other villages	3	2	4	9	10	35	.....
215 Towns	40	36	50	126	75	307	2
216 ORLEANS COUNTY	**11**	**19**	**26**	**56**	**51**	**251**	**1**
217 Albion	2	3	6	11	15	51	.....
218 Medina	2	2	7	11	12	41	.....
219 Other villages	1	2	1	4	4	30	.....
220 Towns	6	12	12	30	20	129	1
221 OSWEGO COUNTY	**47**	**57**	**69**	**173**	**125**	**653**	.....
222 Fulton	7	8	12	27	23	72	.....
223 Oswego	17	27	33	77	39	175	.....
224 Villages	6	5	6	17	13	107	.....
225 Towns	17	17	18	52	50	299	.....
226 OTSEGO COUNTY	**33**	**34**	**44**	**111**	**90**	**487**	**1**
227 Oneonta	15	15	12	42	25	84	.....
228 Cooperstown	1	2	3	6	3	36	.....
229 Other villages	2	5	6	13	10	75	1
230 Towns	15	12	23	50	52	292	.....
231 PUTNAM COUNTY	**7**	**6**	**8**	**21**	**18**	**87**	**1**
232 Cold Spring	1	.....	2	3	3	11	.....
233 Other villages	1	1	.....	2	4	11	.....
234 Towns	5	5	6	16	11	65	1
235 RENSSELAER COUNTY	**131**	**180**	**201**	**512**	**304**	**991**	**1**
236 Rensselaer	7	9	13	29	13	62	1
237 Troy	107	146	164	417	226	640	.....
238 Hoosick Falls	2	6	2	10	15	43	.....
239 Other villages	4	1	2	7	10	28	.....
240 Towns	11	18	20	49	40	218	.....

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths all causes (still-births excluded)	Typhoid fever (1)	Smallpox (5)	Measles (6)	Scarlet fever (7)	Whooping cough (8)	Diphtheria (9)	Influenza (10)	Tuberculosis (all forms) (28-35)
191 ONONDAGA COUNTY	**3,534**	**17**	....	**22**	**14**	**11**	**43**	**20**	**336**
192 Syracuse	2,438	10	....	15	11	10	32	7	186
193 —State Institution for Feebleminded, Syracuse	10	....	....	....	....	....	....	....	5
194 Baldwinsville	44	....	....	....	....	....	....	....	2
195 East Syracuse	50	....	....	....	....	....	2	....	2
196 Solvay	59	2	....	....	....	....	....	....	1
197 Other villages	168	....	....	....	1	....	....	4	8
198 Towns	775	5	....	7	2	1	9	9	137
199 ONTARIO COUNTY	**876**	**4**	....	....	**1**	**1**	**1**	**27**	**48**
200 Canandaigua	162	1	....	....	....	....	....	4	7
201 Geneva	237	2	....	....	1	....	....	3	9
202 Villages	154	....	....	....	....	....	1	7	7
203 Towns	323	1	....	....	....	1	....	13	25
204 ORANGE COUNTY	**2,100**	**6**	....	**5**	**2**	**6**	**14**	**38**	**218**
205 Middletown	442	1	....	2	....	1	2	5	48
206 —Middletown State Hospital	158	....	....	....	....	....	....	....	29
207 Newburgh	539	....	....	3	....	....	8	3	91
208 Port Jervis	193	....	....	....	....	1	....	9	7
209 Cornwall	28	....	....	....	....	....	....	....	3
210 Goshen	50	....	....	....	....	....	....	1	3
211 Highland Falls	50	....	....	....	....	....	1	....	7
212 Walden	53	....	....	....	1	....	....	....	4
213 Warwick	38	1	....	....	....	....	....	....	1
214 Other villages	67	1	....	....	....	3	1	4	2
215 Towns	640	3	....	....	1	1	2	16	52
216 ORLEANS COUNTY	**421**	**1**	....	**1**	....	**1**	**1**	**10**	**27**
217 Albion	91	....	....	....	....	....	....	1	7
218 Medina	83	....	....	....	....	....	1	4	4
219 Other villages	43	....	....	1	....	....	....	....	3
220 Towns	204	1	....	....	....	1	....	5	13
221 OSWEGO COUNTY	**1,162**	**1**	....	**2**	....	**9**	**7**	**17**	**72**
222 Fulton	161	....	....	....	....	....	4	2	4
223 Oswego	367	1	....	1	....	1	2	5	28
224 Villages	154	....	....	....	....	4	....	5	8
225 Towns	480	....	....	1	....	4	1	5	32
226 OTSEGO COUNTY	**780**	**4**	....	**1**	....	**3**	....	**21**	**26**
227 Oneonta	181	1	....	1	....	1	....	....	8
228 Cooperstown	54	1	....	....	....	....	....	1	1
229 Other villages	109	....	....	....	....	....	....	2	4
230 Towns	436	2	....	....	....	2	....	18	13
231 PUTNAM COUNTY	**164**	....	....	....	....	**2**	**1**	**3**	**13**
232 Cold Spring	25	....	....	....	....	....	....	1	2
233 Other villages	20	....	....	....	....	....	....	....	2
234 Towns	119	....	....	....	....	2	1	2	9
235 RENSSELAER COUNTY	**2,266**	**24**	....	**16**	**4**	**22**	**19**	**41**	**256**
236 Rensselaer	124	1	....	....	1	....	1	2	10
237 Troy	1,654	22	....	14	2	16	16	25	208
238 Hoosick Falls	82	....	....	....	....	2	1	1	7
239 Other villages	53	....	....	....	....	1	....	1	7
240 Towns	353	1	....	2	1	3	1	12	24

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH													
Pulmonary tuberculosis (28, 29)	Tuberculous meningitis (30)	Other forms of tuberculosis (31-35)	Cancer (39-45)	Diabetes (50)	Cerebrospinal meningitis (61b, c)	Acute anterior poliomyelitis (63a)	Apoplexy and cerebral hemorrhage (64)	Organic heart disease (79)	Arteriosclerosis (81)	Bronchitis (89, 90)	Pneumonia (all forms) (91, 92)	Bronchopneumonia (91)	Lobar pneumonia and unqualified (92)	
283	**27**	**26**	**234**	**59**	**2**	**2**	**257**	**491**	**58**	**40**	**364**	**115**	**249**	191
141	25	20	165	38	1	1	176	321	30	26	250	77	173	192
5	.....	.....	.....	.....	.....	.....	1	2	.....	.....	.....	.....	.....	193
1	.....	1	1	1	.....	.....	2	9	2	.....	5	.....	5	194
1	1	.....	1	1	.....	.....	4	8	3	.....	5	2	3	195
1	.....	.....	5	2	1	.....	2	7	.....	.....	5	2	3	196
6	1	1	9	5	.....	.....	18	26	3	7	22	11	11	197
133	.....	4	53	12	.....	1	55	120	20	7	77	23	54	198
40	**2**	**6**	**63**	**7**	**1**	.....	**103**	**143**	**24**	**15**	**75**	**25**	**50**	199
7	.....	.....	10	2	.....	.....	21	27	3	2	9	2	7	200
4	1	4	17	2	1	.....	23	37	7	2	30	8	22	201
7	.....	.....	11	1	.....	.....	20	18	4	4	13	4	9	202
22	1	2	25	2	.....	.....	39	61	10	7	23	11	12	203
196	**8**	**14**	**113**	**25**	**2**	**2**	**170**	**288**	**48**	**25**	**219**	**66**	**153**	204
42	3	3	26	3	1	1	32	67	10	2	56	20	36	205
26	1	2	4	2	.....	.....	8	19	4	.....	16	3	13	206
85	2	4	35	2	1	.....	38	62	7	3	49	11	38	207
7	.....	.....	12	5	.....	.....	13	29	2	4	21	5	16	208
3	.....	.....	2	2	.....	.....	4	7	.....	.....	3	1	2	209
1	2	.....	1	3	.....	.....	5	2	5	1	3	.....	3	210
7	.....	.....	2	.....	.....	.....	3	5	.....	.....	11	7	4	211
4	.....	.....	3	.....	.....	.....	4	8	4	1	11	2	9	212
1	.....	.....	3	3	.....	.....	1	4	3	.....	3	2	1	213
1	.....	1	3	.....	.....	.....	6	8	1	1	6	3	3	214
45	1	6	26	7	.....	1	64	96	16	13	56	15	41	215
22	.....	**5**	**36**	**11**	.....	.....	**49**	**59**	**11**	**8**	**37**	**20**	**17**	216
5	.....	2	8	2	.....	.....	12	12	.....	1	8	4	4	217
4	.....	.....	11	1	.....	.....	4	10	3	.....	4	2	2	218
1	.....	2	5	.....	.....	.....	5	6	3	.....	3	3	.....	219
12	.....	1	12	8	.....	.....	28	31	5	7	22	11	11	220
67	**2**	**3**	**99**	**18**	**1**	.....	**133**	**199**	**23**	**22**	**84**	**32**	**52**	221
4	.....	.....	22	4	.....	.....	12	25	3	.....	19	6	13	222
25	1	2	30	6	.....	.....	39	65	9	3	22	8	14	223
7	.....	1	22	2	.....	.....	22	15	3	5	9	4	5	224
31	1	.....	25	6	1	.....	60	94	8	14	34	14	20	225
20	**3**	**3**	**59**	**7**	**1**	.....	**79**	**134**	**18**	**8**	**50**	**14**	**36**	226
6	2	.....	14	2	1	.....	15	24	4	3	9	2	7	227
.....	.....	1	6	.....	.....	.....	5	9	1	.....	4	2	2	228
3	.....	1	7	2	.....	.....	13	22	2	2	3	1	2	229
11	1	1	32	3	.....	.....	46	79	11	3	34	9	25	230
10	.....	**3**	**16**	**2**	.....	.....	**12**	**27**	**8**	**5**	**15**	**7**	**8**	231
2	.....	.....	1	.....	.....	.....	4	2	2	.....	1	1	.....	232
.....	.....	2	2	.....	.....	.....	2	5	1	.....	1	1	.....	233
8	.....	1	13	2	.....	.....	6	20	5	5	13	5	8	234
227	**15**	**14**	**153**	**29**	**10**	.....	**153**	**326**	**51**	**25**	**280**	**126**	**154**	235
10	.....	.....	6	1	.....	.....	11	21	6	6	12	4	8	236
182	14	12	114	23	10	.....	86	228	36	14	209	96	113	237
7	.....	.....	5	1	.....	.....	9	9	1	.....	11	7	4	238
6	.....	1	5	2	.....	.....	5	7	1	1	3	2	1	239
22	1	1	23	2	.....	.....	42	61	7	4	45	17	28	240

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

	STATE AND SUBDIVISIONS, BY COUNTIES	Diarrhea and enteritis (under 2 years) (104)	Appendicitis (108)	Hernia, intestinal obstruction (109)	Cirrhosis of liver (113)	Nephritis and Bright's disease (119, 120)	Puerperal septicemia (137)	Other puerperal affections (134-136, 138-141)	Total diseases peculiar to early infancy (150-153)	Congenital malformations (150)
191	ONONDAGA COUNTY	**156**	**23**	**34**	**26**	**263**	**15**	**23**	**226**	**31**
192	Syracuse	129	23	31	14	194	13	19	175	26
193	—State Institution for Feeble-minded, Syracuse									
194	Baldwinsville				1	4			3	
195	East Syracuse			1		2			7	
196	Solvay	8			2	2		3	5	1
197	Other villages	5			2	11			5	
198	Towns	14		2	7	50	2	1	31	4
199	ONTARIO COUNTY	**11**	**11**	**9**	**6**	**57**	**6**	**3**	**47**	**9**
200	Canandaigua		5	3	1	15	1	1	5	1
201	Geneva	7	2	3		11	4	1	17	2
202	Villages	2	2			15		1	7	1
203	Towns	2	2	3	5	16	1		18	5
204	ORANGE COUNTY	**53**	**10**	**30**	**24**	**208**	**4**	**11**	**120**	**13**
205	Middletown	3	2	8	3	48		4	14	3
206	—Middletown State Hospital			1	1	24				
207	Newburgh	12	2	9	3	65	3	2	31	2
208	Port Jervis	9	3	4	4	16		1	13	1
209	Cornwall	1				1		1	1	
210	Goshen	1				3			3	1
211	Highland Falls	5				8			2	
212	Walden	2		1	2	3		1	4	2
213	Warwick		1	1		2			8	
214	Other villages	3			1	11			1	
215	Towns	17	2	7	11	51	1	2	43	4
216	ORLEANS COUNTY	**6**	**5**	**3**	**6**	**25**		**3**	**16**	**2**
217	Albion	4		1	1	5			1	
218	Medina	1	2	1	2	7		1	4	
219	Other villages		1			3			2	
220	Towns	1	2	1	3	10		2	9	2
221	OSWEGO COUNTY	**33**	**3**	**14**	**8**	**111**	**3**	**3**	**74**	**14**
222	Fulton	6	1	2	3	9		2	15	2
223	Oswego	17	1	7	4	38	3	1	29	4
224	Villages	5		1	1	16			1	
225	Towns	5	1	4		48			29	8
226	OTSEGO COUNTY	**9**	**3**	**9**	**8**	**76**	**7**	**9**	**37**	**7**
227	Oneonta	4	2	1		15	2	5	14	3
228	Cooperstown		1			5			4	
229	Other villages	2		1	3	11	1		3	1
230	Towns	3		7	5	45	4	4	16	3
231	PUTNAM COUNTY	**4**		**1**		**11**			**11**	**2**
232	Cold Spring	2				3			1	
233	Other villages					2			2	1
234	Towns	2		1		6			8	1
235	RENSSELAER COUNTY	**46**	**16**	**24**	**19**	**228**	**9**	**11**	**108**	**18**
236	Rensselaer	2	1	2		11			5	
237	Troy	32	14	18	15	163	9	11	84	15
238	Hoosick Falls	6				12			4	1
239	Other villages	1			1	4			3	
240	Towns	5	1	4	3	38			12	2

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH — *Concluded*

Premature birth (151a)	Congenital debility (151b)	Other causes peculiar to early infancy (152-153)	Old age (154)	Total accidents (164-181, 185-186)	Railroad accidents (175a)	Automobile accidents (175c)	Drowning (169)	Other accidents	Suicides (155-163)	Homicides (182-184)	All other causes	
120	**38**	**37**	**21**	**254**	**4**	**24**	**41**	**149**	**37**	**10**	**476**	191
92	30	27	17	176	25	19	21	111	24	5	339	192
												193
											2	
1	2		1	5		1	2	2	1		7	194
4		3		4	3			1		1	9	195
2	1	1		3				3			11	196
4		1	2	9	2		4	3	3		28	197
17	5	5	1	57	10	4	14	29	9	4	82	198
27	**2**	**9**	**8**	**56**	**12**	**9**	**2**	**33**	**11**	**2**	**136**	199
4			1	10	3	1		6	2		32	200
7	1	7	4	18	4	5		9	2	1	33	201
5		1	1	7	2	1		4	3		30	202
11	1	1	2	21	3	2	2	14	4	1	41	203
65	**16**	**26**	**14**	**125**	**31**	**11**	**8**	**75**	**26**	**7**	**287**	204
7	1	3	1	19	4	1		14	4		79	205
									1		49	206
18	5	6	1	35	3	3	2	27	6	3	65	207
8	1	3	3	13	6	3		4	2		22	208
1				1	1						2	209
	1	1	3	8	2	1		5			8	210
1		1		2				2	1		3	211
1	1			1				1			3	212
6	1	1		2		1		1			5	213
		1		5	1		1	3	2		8	214
23	6	10	6	39	14	2	5	18	11	4	92	215
11		**3**	**6**	**18**	**2**	**2**	**2**	**12**	**4**		**77**	216
1			1	2	1			1	1		24	217
2		2	3	8		1	1	6	1		11	218
1		1	1	3	1	1		1	1		6	219
7			1	5			1	4	1		36	220
38	**5**	**17**	**13**	**68**	**6**	**9**	**8**	**45**	**3**		**142**	221
8		5	1	12	1	2	3	6			15	222
15	2	8	7	12	2	2	1	7			36	223
1			1	11		2		9	1		22	224
14	3	4	4	33	3	3	4	23	2		69	225
21	**4**	**5**	**14**	**50**	**19**	**5**	**7**	**19**	**10**	**1**	**136**	226
10	1			22	12	3	2	5	2		31	227
3		1	1	1				1			14	228
1		1	2	9	4	1		4	3		17	229
7	3	3	11	18	3	1	5	9	5	1	74	230
7		**2**	**1**	**15**	**1**	**1**	**4**	**9**			**17**	231
1				1				1			5	232
1			1								2	233
5		2		14	1	1	4	8			10	234
42	**31**	**17**	**10**	**100**	**13**	**12**	**10**	**65**	**14**	**5**	**267**	235
1		4	1	9	1	1	2	5			15	236
32	28	9	7	73	8	8	6	51	8	5	192	237
1	2			3				3	1		9	238
1		2		3	1			2			8	239
7	1	2	2	12	3	3	2	4	5		43	240

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths (still-births excluded)	Age in Years						
		Under 1 year	1 to 4	Total under 5 years	5 to 9	10 to 14	15 to 19	Total 5 to 19
241 ROCKLAND COUNTY	**683**	**94**	**35**	**129**	**13**	**19**	**21**	**53**
242 Haverstraw	59	8	3	11	.....	2	1	3
243 Nyack	110	10	5	15	2	3	6	11
244 Spring Valley	23	10	1	11	1	.....	.....	1
245 Suffern	64	7	2	9	.....	1	1	2
246 Other villages	96	18	4	22	3	1	5	9
247 Towns	331	41	20	61	7	12	8	27
248 —Letchworth Village, Thiells	14	.....	.....	.....	1	4	1	6
249 —Hospital for Crippled and Deformed Children, West Haverstraw	1	.....	1	1	.....	.....	.....	.....
250 ST. LAWRENCE COUNTY	**1,653**	**219**	**53**	**272**	**16**	**10**	**31**	**57**
251 Ogdensburg	504	55	13	68	4	2	9	15
252 —St. Lawrence State Hospital	190	.....	.....	.....	.....	.....	.....	.....
253 Canton	42	5	.....	5	.....	.....	.....	.....
254 Gouverneur	63	7	1	8	3	.....	.....	3
255 Massena	78	25	6	31	.....	.....	1	1
256 Potsdam	53	9	2	11	1	.....	1	2
257 Other villages	115	9	3	12	.....	1	1	2
258 Towns	798	109	28	137	8	7	19	34
259 SARATOGA COUNTY	**1,003**	**99**	**33**	**132**	**16**	**7**	**11**	**34**
260 Saratoga Springs	275	13	6	19	3	1	4	8
261 Mechanicville	85	13	5	18	4	1	2	7
262 Ballston Spa	65	6	2	8	3	2	.....	5
263 Waterford	42	10	3	13	.....	.....	.....	.....
264 Other villages	113	14	2	16	2	2	.....	4
265 Towns	423	43	15	58	4	1	5	10
266 SCHENECTADY COUNTY	**1,313**	**258**	**66**	**324**	**21**	**16**	**22**	**59**
267 Schenectady	1,100	229	60	289	18	13	17	48
268 Scotia	35	4	2	6	1	.....	.....	1
269 Towns	178	25	4	29	2	3	5	10
270 SCHOHARIE COUNTY	**409**	**33**	**5**	**38**	**2**	**2**	**7**	**11**
271 Villages	86	7	.....	7	.....	.....	1	1
272 Towns	323	26	5	31	2	2	6	10
273 SCHUYLER COUNTY	**268**	**22**	**7**	**29**	**1**	**1**	**1**	**3**
274 Watkins	57	11	1	12	.....	.....	.....	.....
275 Other villages	51	3	1	4	.....	.....	.....	.....
276 Towns	160	8	5	13	1	1	1	3
277 SENECA COUNTY	**689**	**28**	**10**	**38**	**4**	**3**	**8**	**15**
278 Seneca Falls	101	7	5	12	2	2	3	7
279 Waterloo	69	6	2	8	1	.....	1	2
280 Other villages	30	1	.....	1	.....	.....	.....	.....
281 Towns	489	14	3	17	1	1	4	6
282 —Willard State Hospital	292	.....	.....	.....	.....	.....	1	1
283 STEUBEN COUNTY	**1,431**	**128**	**26**	**154**	**18**	**8**	**22**	**48**
284 Corning	266	37	8	45	7	3	7	17
285 Hornell	194	23	4	27	5	.....	3	8
286 Bath	93	9	2	11	1	3	.....	4
287 Other villages	174	6	4	10	2	1	4	7
288 Towns	704	53	8	61	3	1	8	12
289 —Soldiers' and Sailors' Home	163	.....	.....	.....	.....	.....	.....	.....

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

STATE AND SUBDIVISIONS, BY COUNTIES	Age in Years						
	20 to 29	30 to 39	40 to 49	Total 20 to 49	50 to 59	60 and over	Unknown
241 **ROCKLAND COUNTY**	**44**	**49**	**60**	**153**	**90**	**257**	**1**
242 Haverstraw	4	2	6	12	10	23	.....
243 Nyack	8	12	12	32	18	33	1
244 Spring Valley	1	1	3	5	.....	6	.....
245 Suffern	4	8	10	22	13	18	.....
246 Other villages	6	7	7	20	9	36	.....
247 Towns	21	19	22	62	40	141	.....
248 —Letchworth Village, Thiells	4	3	.....	7	1	.....	.....
249 —Hospital for Crippled and Deformed Children, West Haverstraw	.....	.....	.....	.....	.....	.....	.....
250 **ST. LAWRENCE COUNTY**	**73**	**107**	**106**	**286**	**194**	**841**	**3**
251 Ogdensburg	22	44	54	120	75	226	.....
252 —St. Lawrence State Hospital	6	19	28	53	37	100	.....
253 Canton	.....	1	2	3	4	30	.....
254 Gouverneur	2	3	3	8	6	38	.....
255 Massena	6	7	3	16	8	21	1
256 Potsdam	1	4	3	8	6	26	.....
257 Other villages	7	7	2	16	10	75	.....
258 Towns	35	41	39	115	85	425	2
259 **SARATOGA COUNTY**	**55**	**62**	**88**	**205**	**130**	**500**	**2**
260 Saratoga Springs	9	17	36	62	43	143	.....
261 Mechanicville	5	5	8	18	12	29	1
262 Ballston Spa	1	3	6	10	11	31	.....
263 Waterford	4	2	2	8	6	15	.....
264 Other villages	6	10	7	23	12	58	.....
265 Towns	30	25	29	84	46	224	1
266 **SCHENECTADY COUNTY**	**92**	**90**	**126**	**308**	**150**	**471**	**1**
267 Schenectady	64	75	110	249	130	384	.....
268 Scotia	3	.....	2	5	3	20	.....
269 Towns	25	15	14	54	17	67	1
270 **SCHOHARIE COUNTY**	**13**	**13**	**12**	**38**	**35**	**285**	**2**
271 Villages	1	3	2	6	2	69	1
272 Towns	12	10	10	32	33	216	1
273 **SCHUYLER COUNTY**	**9**	**12**	**14**	**35**	**22**	**179**	.....
274 Watkins	2	5	5	12	6	27	.....
275 Other villages	3	2	1	6	2	39	.....
276 Towns	4	5	8	17	14	113	.....
277 **SENECA COUNTY**	**16**	**38**	**70**	**124**	**105**	**405**	**2**
278 Seneca Falls	2	9	10	21	16	45	.....
279 Waterloo	2	4	3	9	5	45	.....
280 Other villages	1	1	2	4	2	23	.....
281 Towns	11	24	55	90	82	292	2
282 —Willard State Hospital	4	19	43	66	55	170	.....
283 **STEUBEN COUNTY**	**55**	**69**	**113**	**237**	**153**	**837**	**2**
284 Corning	22	17	30	69	30	105	.....
285 Hornell	10	11	18	39	32	88	.....
286 Bath	4	3	15	22	12	44	.....
287 Other villages	7	12	15	34	14	109	.....
288 Towns	12	26	35	73	65	491	2
289 —Soldiers' and Sailors' Home	.....	1	1	2	2	159	.....

Table 16 — *Number of deaths in each city and village of* 2,500 *and over county, classified by broad age periods*

STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths all causes (still-births excluded)	Typhoid fever (1)	Smallpox (5)	Measles (6)	Scarlet fever (7)	Whooping cough (8)	Diphtheria (9)	Influenza (10)	Tuberculosis (all forms) (28-35)
241 ROCKLAND COUNTY	**683**	**6**	....	**5**	**1**	**3**	**8**	**4**	**57**
242 Haverstraw	59	....	....	....	....	....	1	.....	4
243 Nyack	110	....	....	....	....	....	1	1	5
244 Spring Valley	23	....	....	....	....	....	1	.....	.....
245 Suffern	64	4	....	....	....	....	.....	2	3
246 Other villages	96	1	....	....	1	1	1	.....	11
247 Towns	331	1	....	5	....	2	4	1	34
248 —Letchworth village, Thiells	14	....	....	....	....	....	.....	.....	2
249 —West Haverstraw Hospital for Crippled and Deformed Children	1	....	....	....	....	....	.....	.....	1
250 ST. LAWRENCE COUNTY	**1,653**	**10**	....	**10**	**1**	**7**	**6**	**40**	**89**
251 Ogdensburg	504	5	....	4	....	....	2	4	33
252 —St. Lawrence State Hospital	190	2	....	....	....	....	.....	.....	21
253 Canton	42	....	....	....	....	....	.....	1	1
254 Gouverneur	63	....	....	....	....	1	.....	1	4
255 Massena	78	2	....	1	....	1	.....	.....	3
256 Potsdam	53	....	....	....	....	1	.....	2	3
257 Other villages	115	....	....	1	1	....	1	3	8
258 Towns	798	3	....	4	....	4	3	29	37
259 SARATOGA COUNTY	**1,003**	**10**	....	**1**	....	**2**	**7**	**20**	**84**
260 Saratoga Springs	275	1	....	....	....	....	.....	4	14
261 Mechanicville	85	4	....	....	....	....	1	1	6
262 Ballston Spa	65	....	....	1	....	1	2	1	3
263 Waterford	42	....	....	....	....	....	.....	1	6
264 Other villages	113	1	....	....	....	....	2	3	9
265 Towns	423	4	....	....	....	1	2	10	46
266 SCHENECTADY COUNTY	**1,313**	**4**	....	**10**	**2**	**5**	**7**	**14**	**118**
267 Schenectady	1,100	4	....	8	1	5	6	13	77
268 Scotia	35	....	....	....	....	....	.....	.....	3
269 Towns	178	....	....	2	1	....	1	1	38
270 SCHOHARIE COUNTY	**409**	**1**	....	....	....	**1**	.....	**9**	**21**
271 Villages	86	....	....	....	....	....	.....	.....	6
272 Towns	323	1	....	....	....	1	.....	9	15
273 SCHUYLER COUNTY	**268**	**1**	....	....	....	**2**	.....	**7**	**9**
274 Watkins	57	1	....	....	....	2	.....	2	2
275 Other villages	51	....	....	....	....	....	.....	1	2
276 Towns	160	....	....	....	....	....	.....	4	5
277 SENECA COUNTY	**689**	**3**	....	....	....	....	**3**	**5**	**87**
278 Seneca Falls	101	....	....	....	....	....	3	.....	5
279 Waterloo	69	....	....	....	....	....	.....	.....	5
280 Other villages	30	1	....	....	....	....	.....	1	1
281 Towns	489	2	....	....	....	....	.....	4	76
282 —Willard State Hospital	292	....	....	....	....	....	.....	.....	68
283 STEUBEN COUNTY	**1,431**	**5**	....	**1**	**2**	**7**	**16**	**21**	**57**
284 Corning	266	4	....	....	1	....	3	4	17
285 Hornell	194	....	....	....	1	2	3	3	10
286 Bath	93	....	....	....	....	....	2	1	4
287 Other villages	174	1	....	1	....	2	4	2	10
288 Towns	704	....	....	....	....	3	4	11	16
289 —Soldiers' & Sailors' Home	163	....	....	....	....	....	.....	.....	4

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH														
Pulmonary tuberculosis (28, 29)	Tuberculous meningitis (30)	Other forms of tuberculosis (31-35)	Cancer (39-45)	Diabetes (50)	Cerebrospinal meningitis (61b, c)	Acute anterior poliomyelitis (63a)	Apoplexy and cerebral hemorrhage (64)	Organic heart disease (79)	Arteriosclerosis (81)	Bronchitis (89, 90)	Pneumonia (all forms) (91, 92)	Bronchopneumonia (91)	Lobar pneumonia and unqualified (92)	
52	**3**	**2**	**42**	**8**	**1**	.....	**66**	**81**	**14**	**4**	**72**	**23**	**49**	241
4	.....	.....	2	1	.....	.....	6	10	1	.....	4	.....	4	242
5	.....	.....	14	.....	.....	.....	6	16	3	.....	4	1	3	243
.....	.....	.....	1	.....	.....	.....	2	4	.....	.....	4	3	1	244
3	.....	.....	3	1	.....	.....	5	4	2	2	10	5	5	245
8	2	1	5	2	.....	.....	6	7	.....	.....	11	3	8	246
32	1	1	17	4	1	.....	41	40	8	2	39	11	28	247
1	1	.....	.....	1	.....	.....	.....	2	.....	.....	3	.....	3	248
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	249
75	**8**	**6**	**108**	**28**	**2**	**2**	**148**	**283**	**64**	**27**	**149**	**59**	**90**	250
27	3	3	23	9	1	.....	38	111	19	3	45	22	23	251
19	.....	2	3	1	.....	.....	3	73	1	.....	18	9	9	252
1	.....	.....	1	2	.....	.....	6	12	3	1	.....	.....	.....	253
3	1	.....	9	1	.....	.....	5	12	1	1	4	.....	4	254
2	1	.....	4	.....	.....	.....	5	10	.....	2	14	11	3	255
2	.....	1	3	1	.....	.....	11	8	4	.....	3	1	2	256
8	.....	.....	8	.....	.....	.....	11	19	7	5	11	3	8	257
32	3	2	60	15	1	2	72	111	30	15	72	22	50	258
78	**1**	**5**	**69**	**11**	.....	.....	**85**	**145**	**31**	**11**	**118**	**59**	**59**	259
11	1	2	27	2	.....	.....	20	32	11	1	32	12	20	260
6	.....	.....	3	.....	.....	.....	4	14	1	3	14	7	7	261
3	.....	.....	1	.....	.....	.....	9	12	.....	2	8	5	3	262
5	.....	1	.....	.....	.....	.....	3	10	1	.....	8	8	.....	263
8	.....	1	9	2	.....	.....	14	10	3	2	14	9	5	264
45	.....	1	29	7	.....	.....	35	67	15	3	42	18	24	265
104	**8**	**6**	**85**	**13**	**4**	**1**	**108**	**131**	**31**	**9**	**127**	**53**	**74**	266
64	8	5	78	11	4	.....	94	111	28	6	105	42	63	267
3	.....	.....	.....	.....	.....	.....	6	6	2	1	2	.....	2	268
37	.....	1	7	2	.....	1	8	14	1	2	20	11	9	269
21	.....	.....	**29**	**5**	.....	.....	**55**	**72**	**8**	**8**	**21**	**8**	**13**	270
6	.....	.....	5	1	.....	.....	11	14	1	3	5	3	2	271
15	.....	.....	24	4	.....	.....	44	58	7	5	16	5	11	272
7	**1**	**1**	**17**	**1**	.....	**1**	**40**	**45**	**13**	**2**	**15**	**3**	**12**	273
2	.....	.....	2	1	.....	1	3	11	3	1	1	.....	1	274
.....	1	1	5	.....	.....	.....	15	7	5	.....	2	.....	2	275
5	.....	.....	10	.....	.....	.....	22	27	5	1	12	3	9	276
78	**2**	**7**	**33**	**10**	.....	.....	**61**	**131**	**22**	**5**	**83**	**40**	**43**	277
4	.....	1	10	1	.....	.....	13	12	1	.....	15	4	11	278
5	.....	.....	2	3	.....	.....	7	14	1	2	4	.....	4	279
1	.....	.....	2	.....	.....	.....	3	8	1	.....	2	1	1	280
68	2	6	19	6	.....	.....	38	97	19	3	62	35	27	281
62	1	5	10	.....	.....	.....	11	60	14	.....	46	31	15	282
49	**2**	**6**	**107**	**21**	**2**	.....	**138**	**239**	**53**	**13**	**114**	**39**	**75**	283
15	1	1	13	2	1	.....	19	24	8	2	32	5	27	284
10	.....	.....	17	3	.....	.....	14	31	2	2	20	11	9	285
2	.....	2	7	2	.....	.....	8	10	5	1	8	2	6	286
7	.....	3	18	3	.....	.....	19	23	7	4	6	1	5	287
15	1	.....	52	11	1	.....	78	151	31	4	48	20	28	288
4	.....	.....	12	2	.....	.....	12	54	12	.....	10	8	2	289

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

STATE AND SUBDIVISIONS, BY COUNTIES	Diarrhea and enteritis (under 2 years) (104)	Appendicitis (108)	Hernia, intestinal obstruction (109)	Cirrhosis of liver (113)	Nephritis and Bright's disease (119, 120)	Puerperal septicemia (137)	Other puerperal affections (134-136, 138-141)	Total diseases peculiar to early infancy (150-153)	Congenital malformations (150)
241 ROCKLAND COUNTY	**25**	**6**	**3**	**6**	**76**	**4**	**3**	**43**	**11**
242 Haverstraw	2	1	.....	2	11	.....	1	7	1
243 Nyack	4	3	2	1	8	3	.....	6	1
244 Spring Valley	2	.....	.....	.....	1	.....	.....	4	3
245 Suffern	1	1	1	2	2	1	1	3	.....
246 Other villages	6	.....	.....	1	14	.....	1	7	1
247 Towns	10	1	.....	.....	40	.....	.....	16	5
248 —Letchworth Village, Thiells	.....	.....	.....	.....	1	.....	.....	.....	.....
249 —West Haverstraw Hospital for Crippled and Deformed Children	.....	.....	.....	.....	.....	.....	.....	.....	.....
250 ST. LAWRENCE COUNTY	**37**	**7**	**8**	**9**	**103**	**7**	**15**	**109**	**27**
251 Ogdensburg	8	5	5	3	28	3	2	33	16
252 —St. Lawrence State Hospital	.....	.....	1	.....	13	.....	.....	.....	.....
253 Canton	.....	.....	.....	1	1	.....	.....	5	1
254 Gouverneur	1	1	.....	.....	4	1	.....	4	.....
255 Massena	8	.....	.....	.....	4	.....	1	6	1
256 Potsdam	.....	.....	.....	.....	1	.....	.....	5	2
257 Other villages	2	.....	.....	.....	9	.....	.....	4	.....
258 Towns	18	1	3	5	56	3	12	52	7
259 SARATOGA COUNTY	**15**	.....	**5**	**4**	**105**	**1**	**7**	**57**	**6**
260 Saratoga Springs	2	.....	3	1	45	.....	3	9	1
261 Mechanicville	2	.....	.....	.....	4	.....	3	7	.....
262 Ballston Spa	1	.....	.....	1	3	1	.....	3	.....
263 Waterford	1	.....	.....	.....	2	.....	.....	4	.....
264 Other villages	2	.....	.....	2	11	.....	1	9	.....
265 Towns	7	.....	2	.....	40	.....	.....	25	5
266 SCHENECTADY COUNTY	**86**	**9**	**8**	**12**	**99**	**6**	**7**	**124**	**19**
267 Schenectady	78	9	7	12	77	5	7	111	15
268 Scotia	.....	.....	.....	.....	4	.....	.....	4	1
269 Towns	8	.....	1	.....	18	1	.....	9	3
270 SCHOHARIE COUNTY	**1**	**4**	**1**	**1**	**58**	.....	.....	**22**	**1**
271 Villages	.....	.....	1	.....	15	.....	.....	5	1
272 Towns	1	4	.....	1	43	.....	.....	17	.....
273 SCHUYLER COUNTY	**2**	**3**	**1**	**2**	**26**	**2**	**2**	**11**	**2**
274 Watkins	1	1	.....	2	6	1	1	6	.....
275 Other villages	.....	.....	1	.....	3	.....	.....	2	1
276 Towns	1	2	.....	.....	17	1	1	3	1
277 SENECA COUNTY	**1**	.....	**2**	**5**	**72**	**2**	**3**	**16**	**4**
278 Seneca Falls	.....	.....	2	1	8	2	1	3	1
279 Waterloo	.....	.....	.....	1	6	.....	.....	4	1
280 Other villages	.....	.....	.....	.....	3	.....	.....	.....	.....
281 Towns	1	.....	.....	3	55	.....	2	9	2
282 —Willard State Hospital	.....	.....	.....	.....	38	.....	.....	.....	.....
283 STEUBEN COUNTY	**17**	**5**	**22**	**12**	**169**	**3**	**11**	**68**	**8**
284 Corning	9	3	6	1	34	1	3	20	1
285 Hornell	5	1	3	3	7	1	.....	8	1
286 Bath	.....	.....	4	.....	10	1	.....	7	1
287 Other villages	1	.....	1	2	18	.....	4	4	.....
288 Towns	2	1	8	6	100	.....	4	29	5
289 —Soldiers' & Sailors' Home	.....	.....	2	.....	39	.....	.....	.....	.....

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH — *Concluded*

Premature birth (151a)	Congenital debility (151b)	Other causes peculiar to early infancy (152-153)	Old age (154)	Total accidents (164-181, 185-186)	Railroad accidents (175a)	Automobile accidents (175c)	Drowning (169)	Other accidents	Suicides (155-163)	Homicides (182-184)	All other causes	
16	**7**	**9**	**1**	**47**	**13**	**12**	**4**	**18**	**6**	**3**	**88**	241
4	1	1	1	3	2	.....	.....	1	1	.....	1	242
3	1	1	.....	10	2	3	.....	5	.....	1	22	243
.....	1	.....	.....	1	.....	1	.....	.....	1	.....	2	244
1	.....	2	.....	7	2	2	.....	3	2	1	6	245
3	1	2	.....	4	2	.....	2	.....	.....	1	16	246
5	3	3	.....	22	5	6	2	9	2	.....	41	247
.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	248
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	249
56	**13**	**13**	**10**	**79**	**11**	**8**	**14**	**46**	**18**	**6**	**271**	250
12	2	3	1	18	1	3	2	12	5	.....	96	251
.....	.....	.....	.....	2	.....	.....	.....	2	2	.....	50	252
2	.....	2	.....	.....	.....	.....	.....	.....	1	.....	7	253
2	2	.....	.....	2	.....	.....	.....	2	.....	.....	11	254
4	.....	1	2	5	1	.....	1	3	2	1	7	255
2	.....	1	.....	3	.....	.....	1	2	3	.....	5	256
3	.....	1	1	8	1	1	1	5	.....	.....	16	257
31	9	5	6	43	8	4	9	22	7	5	129	258
30	**3**	**18**	**10**	**59**	**6**	**9**	**11**	**33**	**13**	**2**	**131**	259
5	.....	3	.....	20	1	2	3	14	4	.....	44	260
2	1	4	.....	5	1	.....	.....	4	.....	.....	13	261
3	.....	.....	1	6	1	1	.....	4	.....	.....	9	262
4	.....	.....	.....	2	1	.....	1	.....	.....	.....	4	263
6	1	2	3	4	.....	.....	2	2	1	.....	11	264
10	1	9	6	22	2	6	5	9	8	2	50	265
62	**14**	**29**	**3**	**85**	**18**	**17**	**9**	**41**	**14**	**6**	**185**	266
57	11	28	2	66	11	15	5	35	13	5	157	267
1	2	.....	1	1	.....	.....	.....	1	.....	.....	5	268
4	1	1	.....	18	7	2	4	5	1	1	23	269
12	**5**	**4**	**10**	**23**	**4**	.....	**2**	**17**	**3**	**1**	**55**	270
2	.....	2	2	3	.....	.....	.....	3	.....	.....	14	271
10	5	2	8	20	4	.....	2	14	3	1	41	272
2	**4**	**3**	**8**	**11**	.....	.....	**1**	**10**	**2**	**2**	**43**	273
2	2	2	2	1	.....	.....	.....	1	.....	.....	6	274
.....	.....	1	.....	3	.....	.....	.....	3	.....	.....	5	275
.....	2	.....	6	7	.....	.....	1	6	2	2	32	276
6	**2**	**4**	**6**	**46**	**8**	**3**	**7**	**28**	**3**	**1**	**89**	277
1	1	.....	.....	13	1	2	2	8	.....	.....	11	278
3	.....	.....	2	4	.....	.....	1	3	1	.....	13	279
.....	.....	.....	.....	5	.....	.....	.....	5	.....	.....	3	280
2	1	4	4	24	7	1	4	12	2	1	62	281
.....	.....	.....	1	6	1	.....	.....	5	.....	.....	38	282
31	**10**	**19**	**18**	**82**	**28**	**10**	**4**	**40**	**8**	**2**	**218**	283
11	3	5	2	20	9	3	2	6	2	.....	35	284
3	1	3	2	17	6	1	1	9	1	.....	38	285
2	.....	4	2	4	1	.....	.....	3	1	1	15	286
3	.....	1	3	8	5	1	.....	2	.....	.....	33	287
12	6	6	9	33	7	5	1	20	4	1	97	288
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16	289

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

	STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths (still-births excluded)	Age in Years						
			Under 1 year	1 to 4	Total under 5 years	5 to 9	10 to 14	15 to 19	Total 5 to 19
290	SUFFOLK COUNTY	**2,452**	**133**	**56**	**189**	**36**	**27**	**35**	**98**
291	Amityville	102	4	2	6	3	1	2	6
292	Babylon	56	4	1	5	2	2	1	5
293	Greenport	60	11	3	14	5	1	1	7
294	Northport	21	.....	.....	.....	2	1	.....	3
295	Patchogue	51	5	2	7	3	.....	.....	3
296	Sag Harbor	32	1	3	4	.....	.....	.....	.....
297	Southampton	73	16	2	18	.....	4	2	6
298	Other villages	9	1	.....	1	.....	.....	.....	.....
299	Towns	2,048	91	43	134	21	18	29	86
300	—Central Islip State Hospital	541	.....	1	1	.....	.....	7	7
301	—Kings Park State Hospital	449	2	.....	2	.....	1	3	4
302	SULLIVAN COUNTY	**672**	**48**	**4**	**52**	**3**	**7**	**19**	**29**
303	Villages	173	3	.....	3	.....	3	5	8
304	Towns	499	45	4	49	3	4	14	21
305	TIOGA COUNTY	**423**	**35**	**18**	**53**	**5**	**1**	**7**	**13**
306	Owego	94	7	7	14	1	.....	3	4
307	Waverly	68	7	3	10	.....	.....	.....	.....
308	Other villages	68	3	.....	3	1	1	.....	2
309	Towns	193	18	8	26	3	.....	4	7
310	TOMPKINS COUNTY	**588**	**48**	**7**	**55**	**1**	**5**	**8**	**14**
311	Ithaca	273	18	2	20	1	1	6	8
312	Villages	69	6	1	7	.....	.....	1	1
313	Towns	246	24	4	28	.....	4	1	5
314	ULSTER COUNTY	**1,290**	**120**	**35**	**155**	**25**	**15**	**24**	**64**
315	Kingston	520	45	18	63	11	7	9	27
316	Ellenville	53	5	.....	5	1	.....	1	2
317	Saugerties	67	6	4	10	1	.....	1	2
318	Other villages	53	6	.....	6	1	2	2	5
319	Towns	597	58	13	71	11	6	11	28
320	—Eastern New York Reformatory, Napanoch	1	.....	.....	.....	.....	.....	.....	.....
321	WARREN COUNTY	**507**	**51**	**21**	**72**	**8**	**6**	**7**	**21**
322	Glens Falls	279	28	13	41	6	4	5	15
323	Villages	8	.....	.....	.....	.....	.....	.....	.....
324	Towns	220	23	8	31	2	2	2	6
325	WASHINGTON COUNTY	**662**	**95**	**13**	**108**	**7**	.....	**7**	**14**
326	Fort Edward	59	13	2	15	.....	.....	1	1
327	Granville	44	9	.....	9	1	.....	1	2
328	Hudson Falls	65	12	1	13	.....	.....	1	1
329	Whitehall	80	11	2	13	4	.....	1	5
330	Other villages	86	6	2	8	1	.....	1	2
331	Towns	328	44	6	50	1	.....	2	3
332	—Great Meadow Pris. Comstock	2	.....	.....	.....	.....	.....	.....	.....
333	WAYNE COUNTY	**758**	**58**	**28**	**86**	**8**	**4**	**13**	**25**
334	Clyde	39	9	1	10	.....	1	.....	1
335	Lyons	73	8	5	13	2	.....	1	3
336	Newark	93	5	1	6	1	1	2	4
337	Other villages	82	2	4	6	.....	.....	3	3
338	Towns	471	34	17	51	5	2	7	14
339	—Newark State Custodial Asylum	12	.....	.....	.....	.....	.....	1	1

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

STATE AND SUBDIVISIONS, BY COUNTIES	AGE IN YEARS						
	20 to 29	30 to 39	40 to 49	Total 20 to 49	50 to 59	60 and over	Unknown
290 SUFFOLK COUNTY	**189**	**276**	**324**	**789**	**342**	**1,030**	**4**
291 Amityville	7	8	8	23	18	48	1
292 Babylon	4	6	7	17	5	24	.....
293 Greenport	3	3	6	12	4	23	.....
294 Northport	1	1	2	4	3	10	1
295 Patchogue	1	6	4	11	6	24	.....
296 Sag Harbor	1	1	1	3	4	21	.....
297 Southampton	5	3	10	18	6	25	.....
298 Other villages	.....	.....	1	1	1	6	.....
299 Towns	167	248	285	700	295	849	2
300 —Central Islip State Hospital	50	116	102	268	97	167	.....
301 —Kings Park State Hospital	47	82	103	232	79	132	.....
302 SULLIVAN COUNTY	**73**	**90**	**85**	**248**	**71**	**272**	.....
303 Villages	28	36	28	92	14	56	.....
304 Towns	45	54	57	156	57	216	.....
305 TIOGA COUNTY	**12**	**19**	**21**	**52**	**36**	**269**	.....
306 Owego	3	.....	7	10	11	55	.....
307 Waverly	1	4	2	7	7	44	.....
308 Other villages	.....	2	3	5	4	54	.....
309 Towns	8	13	9	30	14	116	.....
310 TOMPKINS COUNTY	**30**	**20**	**48**	**98**	**64**	**356**	**1**
311 Ithaca	20	10	24	54	38	153	.....
312 Villages	4	2	4	10	7	44	.....
313 Towns	6	8	20	34	19	159	1
314 ULSTER COUNTY	**67**	**88**	**108**	**263**	**164**	**643**	**1**
315 Kingston	33	46	48	127	86	216	1
316 Ellenville	1	3	5	9	9	28	.....
317 Saugerties	1	1	8	10	12	33	.....
318 Other villages	4	6	4	14	4	24	.....
319 Towns	28	32	43	103	53	342	.....
320 —Eastern New State Reformatory, Napanoch	1	.....	.....	1	.....	.....	.....
321 WARREN COUNTY	**24**	**24**	**50**	**98**	**66**	**247**	**3**
322 Glens Falls	16	12	32	60	39	123	1
323 Villages	1	4	1	6	.....	2	.....
324 Towns	7	8	17	32	27	122	2
325 WASHINGTON COUNTY	**23**	**29**	**42**	**94**	**73**	**370**	**3**
326 Fort Edward	2	5	5	12	3	27	1
327 Granville	2	3	6	11	7	15	.....
328 Hudson Falls	4	2	7	13	6	32	.....
329 Whitehall	7	5	4	16	10	36	.....
330 Other villages	.....	3	4	7	9	59	1
331 Towns	8	11	16	35	38	201	1
332 —Great Meadow Pris ,Comstock	1	.....	.....	1	1	.....	.....
333 WAYNE COUNTY	**34**	**31**	**57**	**122**	**87**	**437**	**1**
334 Clyde	1	2	2	5	5	18	.....
335 Lyons	2	2	12	16	6	35	.....
336 Newark	9	9	8	26	12	45	.....
337 Other villages	2	2	4	8	12	53	.....
338 Towns	20	16	31	67	52	286	1
339 —Newark State Custodial Asylum	6	3	1	10	1	.....	.....

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths all causes (still-births excluded)	Typhoid fever (1)	Smallpox (5)	Measles (6)	Scarlet fever (7)	Whooping cough (8)	Diphtheria (9)	Influenza (10)	Tuberculosis (all forms) (28-35)
290 SUFFOLK COUNTY	2,452	7	....	7	1	5	13	27	225
291 Amityville	102	....	....	....	....	....	....	....	3
292 Babylon	56	....	....	....	....	....	....	1	2
293 Greenport	60	....	....	....	....	....	4	2	4
294 Northport	21	....	....	....	....	....	1	4	1
295 Patchogue	51	....	....	....	....	....	2	....	3
296 Sag Harbor	32	....	....	....	....	....	....	1	1
297 Southampton	73	1	....	....	....	2	....	2	4
298 Other villages	9	....	....	....	....	....	....	....	....
299 Towns	2,048	6	....	7	1	3	6	17	207
300 —Central Islip State Hospital	541	2	....	....	....	....	....	....	62
301 —Kings Park State Hospital	449	....	....	....	....	....	....	....	74
302 SULLIVAN COUNTY	672	3	....	....	1	2	....	9	215
303 Villages	173	1	....	....	....	....	....	1	92
304 Towns	499	2	....	....	1	2	....	8	123
305 TIOGA COUNTY	423	5	....	5	1	2	7	15	18
306 Owego	94	1	....	1	1	....	3	....	8
307 Waverly	68	1	....	....	....	1	1	....	....
308 Other villages	68	....	....	1	....	....	....	6	2
309 Towns	193	3	....	3	....	1	3	9	8
310 TOMPKINS COUNTY	588	5	....	1	....	1	....	17	31
311 Ithaca	273	3	....	....	....	....	....	4	12
312 Villages	69	1	....	....	....	....	....	5	3
313 Towns	246	1	....	1	....	1	....	8	16
314 ULSTER COUNTY	1,290	9	....	2	....	6	5	30	125
315 Kingston	520	3	....	....	....	2	2	9	57
316 Ellenville	53	....	....	1	....	....	....	1	5
317 Saugerties	67	....	....	....	....	1	....	2	11
318 Other villages	53	1	....	....	....	....	1	2	4
319 Towns	597	5	....	1	....	3	2	16	48
320 —Eastern New York Reformatory, Napanoch	1	....	....	....	....	....	....	....	1
321 WARREN COUNTY	507	3	....	....	1	1	6	10	38
322 Glens Falls	279	2	....	....	1	....	4	4	21
323 Villages	8	....	....	....	....	....	....	....	2
324 Towns	220	1	....	....	....	1	2	6	15
325 WASHINGTON COUNTY	662	4	....	3	....	1	6	13	34
326 Fort Edward	59	....	....	....	....	....	....	2	3
327 Granville	44	1	....	....	....	....	1	....	7
328 Hudson Falls	65	....	....	....	....	....	....	2	3
329 Whitehall	80	1	....	....	....	1	3	1	5
330 Other villages	86	1	....	1	....	....	1	1	6
331 Towns	328	1	....	2	....	....	1	7	10
332 —Great Meadow Pris, Comstock	2	....	....	....	....	....	....	....	....
333 WAYNE COUNTY	758	2	....	5	....	5	1	10	43
334 Clyde	39	....	....	....	....	1	....	....	3
335 Lyons	73	....	....	2	....	....	....	....	3
336 Newark	93	....	....	....	....	....	1	2	9
337 Other villages	82	....	....	....	....	1	....	....	6
338 Towns	471	2	....	3	....	3	....	8	22
339 —Newark State Custodial Asy	12	....	....	....	....	....	....	1	2

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH														
Pulmonary tuberculosis (28, 29)	Tuberculous meningitis (30)	Other forms of tuberculosis (31-35)	Cancer (39-45)	Diabetes (50)	Cerebrospinal meningitis (61b, c)	Acute anterior poliomyelitis (63a)	Apoplexy and cerebral hemorrhage (64)	Organic heart disease (79)	Arteriosclerosis (81)	Bronchitis (89, 90)	Pneumonia (all forms) (91, 92)	Bronchopneumonia (91)	Lobar pneumonia and unqualified (92)	
211	**10**	**4**	**115**	**32**	**1**	**2**	**150**	**283**	**142**	**22**	**233**	**98**	**135**	290
2	1	.....	9	2	.....	.....	5	14	1	2	9	4	5	291
2	.....	.....	3	2	.....	.....	10	4	2	.....	.....	.....	.....	292
3	.....	1	6	.....	.....	.....	3	2	8	.....	6	.....	6	293
1	.....	.....	2	.....	.....	.....	.....	6	1	1	1	.....	1	294
1	1	1	2	1	.....	.....	7	6	1	2	6	.....	6	295
1	.....	.....	2	1	.....	.....	2	5	1	.....	3	1	2	296
3	1	.....	3	1	.....	.....	6	8	1	.....	7	1	6	297
.....	.....	.....	2	.....	.....	.....	1	2	.....	.....	1	1	.....	298
198	7	2	86	25	1	2	116	236	127	17	200	91	109	299
62	.....	.....	8	.....	.....	.....	8	48	52	.....	54	25	29	300
74	.....	.....	3	2	.....	.....	7	32	36	.....	81	45	36	301
211	**2**	**2**	**33**	**8**	.....	**2**	**44**	**88**	**5**	**9**	**55**	**21**	**34**	302
92	.....	.....	8	2	.....	.....	9	19	.....	.....	6	1	5	303
119	2	2	25	6	.....	2	35	69	5	9	49	20	29	304
17	.....	**1**	**21**	**6**	.....	.....	**46**	**65**	**12**	**7**	**28**	**5**	**23**	305
7	.....	1	6	1	.....	.....	12	11	2	2	4	1	3	306
.....	.....	.....	5	2	.....	.....	11	16	.....	1	5	1	4	307
2	.....	.....	2	2	.....	.....	4	10	3	.....	4	2	2	308
8	.....	.....	8	1	.....	.....	19	28	7	4	15	1	14	309
28	**1**	**2**	**50**	**14**	.....	**1**	**60**	**77**	**16**	**5**	**56**	**13**	**43**	310
9	1	2	29	3	.....	.....	29	30	10	.....	28	6	22	311
3	.....	.....	4	4	.....	.....	6	10	2	1	9	5	4	312
16	.....	.....	17	7	.....	1	25	37	4	4	19	2	17	313
116	**3**	**6**	**75**	**19**	**2**	.....	**139**	**189**	**35**	**16**	**101**	**26**	**75**	314
53	1	3	28	4	.....	.....	49	74	14	6	39	12	27	315
5	.....	.....	6	3	.....	.....	5	4	2	1	5	.....	5	316
10	1	.....	1	3	.....	.....	6	12	.....	.....	7	1	6	317
4	.....	.....	5	2	.....	.....	8	9	2	.....	3	1	2	318
44	1	3	35	7	2	.....	71	90	17	9	47	12	35	319
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	320
31	**3**	**4**	**36**	**12**	.....	.....	**44**	**80**	**14**	**2**	**44**	**12**	**32**	321
15	3	3	22	3	.....	.....	26	46	5	1	20	7	13	322
2	.....	.....	1	1	.....	.....	1	2	.....	.....	.....	.....	.....	323
14	.....	1	13	8	.....	.....	17	32	9	1	24	5	19	324
32	.....	**2**	**44**	**7**	**3**	.....	**51**	**103**	**23**	**14**	**71**	**34**	**37**	325
3	.....	.....	4	1	.....	.....	1	15	.....	.....	6	2	4	326
6	.....	1	4	.....	.....	.....	2	.....	.....	2	4	3	1	327
3	.....	.....	2	4	2	.....	7	6	3	1	9	6	3	328
5	.....	.....	6	.....	.....	.....	1	11	3	2	8	2	6	329
5	.....	1	8	1	.....	.....	5	20	5	.....	9	2	7	330
10	.....	.....	20	1	1	.....	35	51	12	9	35	19	16	331
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	332
36	**4**	**3**	**69**	**14**	.....	**1**	**91**	**95**	**23**	**5**	**59**	**22**	**37**	333
2	1	.....	3	1	.....	.....	7	5	1	.....	3	1	2	334
2	.....	1	7	1	.....	.....	11	8	2	.....	3	2	1	335
7	2	.....	11	.....	.....	.....	8	14	2	.....	5	1	4	336
5	.....	1	12	.....	.....	.....	9	12	1	3	4	3	1	337
20	1	1	36	12	.....	1	56	56	17	2	44	15	29	338
4	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	339

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

STATE AND SUBDIVISIONS, BY COUNTIES	Diarrhea and enteritis (under 2 years) (104)	Appendicitis (108)	Hernia, intestinal obstruction (109)	Cirrhosis of liver (113)	Nephritis and Bright's disease (119, 120)	Puerperal septicemia (137)	Other puerperal affections (134-136, 138-141)	Total diseases peculiar to early infancy (150-153)	Congenital malformations (150)
290 SUFFOLK COUNTY	30	12	20	18	222	2	4	62	14
291 Amityville	3	.....	.....	.....	10	.....	.....	1	.....
292 Babylon	.....	1	2	1	4	.....	.....	2	.....
293 Greenport	.....	.....	.....	.....	1	.....	.....	8	1
294 Northport	.....	.....	1	.....	.....	.....	.....	.....	.....
295 Patchogue	1	.....	1	1	4	1	.....	3	1
296 Sag Harbor	.....	.....	1	.....	4	.....	.....	1	.....
297 Southampton	3	4	4	.....	5	.....	1	2	1
298 Other villages	.....	.....	.....	.....	.....	.....	.....	.....	.....
299 Towns	23	7	11	16	194	1	3	45	11
300 —Central Islip State Hospital	.....	.....	3	2	52	.....	.....	1	1
301 —Kings Park State Hospital	.....	1	1	1	28	.....	.....	.....	.....
302 SULLIVAN COUNTY	2	1	5	6	42	2	2	22	3
303 Villages	1	.....	1	3	10	.....	.....	2	.....
304 Towns	1	1	4	3	32	2	2	20	3
305 TIOGA COUNTY	7	.....	1	4	47	.....	6	19	4
306 Owego	2	.....	.....	.....	10	.....	.....	5	2
307 Waverly	2	.....	.....	1	5	.....	.....	1	.....
308 Other villages	1	.....	.....	1	14	.....	.....	1	.....
309 Towns	2	.....	1	2	18	.....	6	12	2
310 TOMPKINS COUNTY	5	4	5	4	64	3	2	28	5
311 Ithaca	1	2	2	2	36	1	1	12	1
312 Villages	.....	.....	.....	.....	6	1	1	3	1
313 Towns	4	2	3	2	22	1	.....	13	3
314 ULSTER COUNTY	27	13	13	6	105	2	6	55	13
315 Kingston	7	12	6	1	47	1	2	23	5
316 Ellenville	.....	.....	.....	.....	4	.....	.....	4	.....
317 Saugerties	2	.....	1	.....	8	.....	.....	2	1
318 Other villages	1	.....	2	1	2	.....	1	2	.....
319 Towns	17	1	4	4	44	1	3	21	7
320 —Eastern New York Reformatory, Napanoch	.....	.....	.....	.....	.....	.....	.....	.....	.....
321 WARREN COUNTY	7	7	6	1	48	1	1	34	8
322 Glens Falls	5	6	5	1	20	1	1	19	4
323 Villages	.....	.....	.....	.....	1	.....	.....	.....	.....
324 Towns	2	1	1	.....	27	.....	.....	15	4
325 WASHINGTON COUNTY	18	.....	4	8	66	2	7	37	1
326 Fort Edward	4	.....	.....	1	5	.....	.....	6	1
327 Granville	1	.....	.....	.....	8	.....	.....	5	.....
328 Hudson Falls	3	.....	.....	.....	7	.....	1	6	.....
329 Whitehall	3	.....	1	2	12	1	.....	3	.....
330 Other villages	.....	.....	.....	2	5	.....	2	2	.....
331 Towns	7	.....	3	3	29	1	4	15	.....
332 —Great Meadow Pris., Comstock	.....	.....	.....	.....	1	.....	.....	.....	.....
333 WAYNE COUNTY	10	3	6	6	68	4	4	37	6
334 Clyde	1	.....	.....	1	1	.....	.....	5	.....
335 Lyons	5	.....	1	1	7	1	.....	4	.....
336 Newark	1	.....	.....	1	7	.....	1	4	2
337 Other villages	.....	.....	.....	1	4	1	.....	1	.....
338 Towns	3	3	5	2	49	2	3	23	4
339 —Newark State Custodial Asy	.....	.....	.....	.....	1	.....	.....	.....	.....

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

CAUSE OF DEATH — *Concluded*

Premature birth (151a)	Congenital debility (151b)	Other causes peculiar to early infancy (152-153)	Old age (154)	Total accidents (164-181, 185-186)	Railroad accidents (175a)	Automobile accidents (175c)	Drowning (169)	Other accidents	Suicides (155-163)	Homicides (182-184)	All other causes	
28	**7**	**13**	**18**	**116**	**16**	**14**	**13**	**73**	**23**	2	**658**	290
1	.....	.....	.....	2	2	.....	.....	.....	.....	.....	41	291
2	.....	.....	1	9	.....	3	.....	6	2	.....	10	292
5	.....	2	.....	7	4	.....	.....	3	.....	.....	9	293
.....	.....	.....	.....	2	.....	.....	2	.....	.....	.....	1	294
2	.....	.....	1	1	.....	.....	.....	1	1	.....	7	295
.....	.....	1	2	3	.....	.....	.....	3	.....	.....	5	296
1	.....	.....	.....	5	.....	2	.....	3	3	1	10	297
.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	1	298
17	7	10	12	87	10	9	11	57	17	1	574	299
.....	.....	.....	.....	4	.....	.....	.....	4	3	.....	242	300
.....	.....	.....	1	8	.....	.....	.....	8	3	.....	171	301
10	**4**	**5**	**4**	**24**	**3**	**1**	**9**	**11**	**6**	**1**	**81**	302
1	.....	1	1	1	.....	.....	.....	1	1	.....	15	303
9	4	4	3	23	3	1	9	10	5	1	66	304
6	**4**	**5**	**9**	**34**	**5**	**2**	**2**	**25**	**4**	.....	**54**	305
1	1	1	4	11	3	1	1	6	.....	.....	10	306
1	.....	.....	1	4	1	.....	.....	3	1	.....	10	307
1	.....	.....	.....	5	.....	1	.....	4	.....	.....	12	308
3	3	4	4	14	1	.....	1	12	3	.....	22	309
11	**6**	**6**	**10**	**33**	**2**	**4**	**2**	**25**	**5**	.....	**91**	310
6	2	3	5	16	.....	3	1	12	4	.....	43	311
1	1	.....	3	3	.....	.....	.....	3	.....	.....	7	312
4	3	3	2	14	2	1	1	10	1	.....	41	313
34	**5**	**3**	**13**	**79**	**5**	**6**	**14**	**54**	**11**	**3**	**204**	314
17	3	1	8	34	3	2	2	27	5	1	83	315
4	.....	.....	.....	2	.....	.....	.....	2	.....	.....	10	316
.....	.....	1	.....	2	.....	.....	1	1	1	.....	8	317
2	.....	.....	1	2	.....	.....	2	.....	.....	.....	4	318
11	2	1	4	39	2	4	9	24	5	2	99	319
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	320
20	**2**	**4**	**3**	**27**	**2**	**3**	**4**	**18**	**3**	.....	**73**	321
11	2	2	5	16	1	3	.....	12	3	.....	42	322
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	323
9	.....	2	3	11	1	.....	4	6	.....	.....	31	324
17	**7**	**12**	**11**	**33**	**6**	**1**	**3**	**23**	**3**	**1**	**95**	325
3	.....	2	.....	6	2	.....	.....	4	.....	.....	5	326
1	1	3	3	2	.....	1	.....	1	.....	.....	4	327
5	.....	1	.....	4	.....	.....	1	3	.....	.....	5	328
.....	2	1	.....	5	3	.....	.....	2	.....	1	10	329
1	.....	1	2	3	.....	.....	.....	3	.....	.....	12	330
7	4	4	6	13	1	.....	2	10	3	.....	59	331
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	332
19	**2**	**10**	**18**	**55**	**15**	**1**	**8**	**31**	**4**	**1**	**119**	333
4	.....	1	.....	.....	.....	.....	.....	.....	.....	1	6	334
.....	2	2	1	7	3	.....	1	3	.....	.....	9	335
1	.....	1	2	8	2	.....	2	4	.....	.....	17	336
1	.....	.....	4	5	.....	.....	1	4	.....	.....	18	337
13	.....	6	11	35	10	1	4	20	4	.....	69	338
.....	.....	.....	.....	2	.....	.....	.....	2	.....	.....	1	339

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods*

	STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths (still-births excluded)	AGE IN YEARS						
			Under 1 year	1 to 4	Total under 5 years	5 to 9	10 to 14	15 to 19	Total 5 to 19
340	**WESTCHESTER COUNTY**	**4,191**	**610**	**258**	**868**	**83**	**49**	**80**	**212**
341	Mt. Vernon	419	50	22	72	8	7	3	18
342	New Rochelle	358	66	14	80	9	1	5	15
343	Ossining	165	19	9	28	3	3	2	8
344	—Sing Sing Prison	12	.....	.....	.....	.....	.....	.....	.....
345	Peekskill	224	30	3	33	8	2	4	14
346	White Plains	258	33	12	45	10	9	4	23
347	Port Chester	221	50	18	68	2	4	8	14
348	Yonkers	1,202	209	101	310	24	13	30	67
349	Dobbs Ferry	62	9	5	14	1	1	2	4
350	Hastings-on-Hudson	55	10	6	16	.....	1	.....	1
351	Mamaroneck	105	11	7	18	3	.....	3	6
352	Mt. Kisco	47	7	4	11	.....	.....	1	1
353	North Tarrytown	60	15	7	22	3	.....	.....	3
354	Rye	37	5	5	10	.....	.....	.....	.....
355	Tarrytown	84	17	4	21	2	1	.....	3
356	Tuckahoe	40	12	7	19	1	1	1	3
357	Other villages	162	18	7	25	3	3	4	10
358	Towns	692	49	27	76	6	3	13	22
359	—State Reformatory for Women, Bedford	3	3	.....	3	.....	.....	.....	.....
360	**WYOMING COUNTY**	**423**	**43**	**11**	**54**	**2**	**3**	**4**	**9**
361	Perry	64	12	1	13	.....	.....	1	1
362	Warsaw	67	7	3	10	.....	.....	.....	.....
363	Other villages	105	9	4	13	.....	1	1	2
364	Towns	187	15	3	18	2	2	2	6
365	**YATES COUNTY**	**281**	**29**	**1**	**30**	**4**	.....	**2**	**6**
366	Penn Yan	84	8	.....	8	1	.....	1	2
367	Other villages	48	4	.....	4	.....	.....	1	1
368	Towns	149	17	1	18	3	.....	.....	3

in the State during 1917, *with total for other villages and towns in each and important causes* — (Continued)

STATE AND SUBDIVISIONS, BY COUNTIES	AGE IN YEARS						
	20 to 29	30 to 39	40 to 49	Total 20 to 49	50 to 59	60 and over	Unknown
340 **WESTCHESTER COUNTY**	**271**	**330**	**467**	**1,068**	**559**	**1,481**	**3**
341 Mt. Vernon	27	28	37	92	60	176	1
342 New Rochelle	16	32	44	92	58	113	.....
343 Ossining	15	12	20	47	15	66	1
344 —Sing Sing Prison	4	3	3	10	1	1	.....
345 Peekskill	15	20	22	57	32	88	.....
346 White Plains	7	18	29	54	50	86	.....
347 Port Chester	22	6	23	51	33	55	.....
348 Yonkers	85	118	151	354	141	330	.....
349 Dobbs Ferry	9	3	7	19	4	21	.....
350 Hastings-on-Hudson	3	5	3	11	5	22	.....
351 Mamaroneck	5	9	14	28	11	42	.....
352 Mt. Kisco	5	5	3	13	8	14	.....
353 North Tarrytown	3	5	5	13	7	15	.....
354 Rye	2	1	3	6	1	20	.....
355 Tarrytown	8	4	3	15	7	38	.....
356 Tuckahoe	1	2	3	6	2	10	.....
357 Other villages	8	7	16	31	22	74	.....
358 Towns	40	55	84	179	103	311	1
359 —State Reformatory for Women, Bedford	.....	.....	.....	.....	.....	.....	.....
360 **WYOMING COUNTY**	**21**	**19**	**35**	**75**	**44**	**241**	.....
361 Perry	4	1	5	10	7	33	.....
362 Warsaw	5	6	6	17	10	30	.....
363 Other villages	3	6	3	12	12	66	.....
364 Towns	9	6	21	36	15	112	.....
365 **YATES COUNTY**	**5**	**9**	**12**	**26**	**35**	**183**	**1**
366 Penn Yan	2	4	7	13	9	52	.....
367 Other villages	.....	.....	.....	.....	5	38	.....
368 Towns	3	5	5	13	21	93	1

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods and*

STATE AND SUBDIVISIONS, BY COUNTIES	Total deaths all causes (still-births ex-cluded)	Typhoid fever (1)	Smallpox (5)	Measles (6)	Scarlet fever (7)	Whooping cough (8)	Diphtheria (9)	Influenza (10)	Tuberculosis (all forms) (28-35)
340 WESTCHESTER COUNTY	**4,191**	**16**	....	**9**	**7**	**23**	**47**	**33**	**423**
341 Mt. Vernon	419	4	....	3	....	2	2	1	25
342 New Rochelle	358	1	....	....	....	2	1	4	16
343 Ossining	165	....	....	....	1	....	2	2	16
344 —Sing Sing Prison	12	....	....	....	....	....	....	....	2
345 Peekskill	224	....	....	....	....	1	....	5	26
346 White Plains	258	....	....	1	....	....	3	....	21
347 Port Chester	221	....	....	....	....	4	2	3	18
348 Yonkers	1,202	6	....	1	6	6	24	4	143
349 Dobbs Ferry	62	1	....	....	....	....	1	....	4
350 Hastings-on-Hudson	55	....	....	....	....	....	....	....	5
351 Mamaroneck	105	1	....	2	....	2	....	1	10
352 Mt. Kisco	47	1	....	....	....	....	....	2	3
353 North Tarrytown	60	....	....	1	....	....	2	3	8
354 Rye	37	....	....	....	....	1	2	....	1
355 Tarrytown	84	....	....	....	....	1	....	....	4
356 Tuckahoe	40	1	....	....	....	....	3	1	4
357 Other villages	162	1	....	....	....	....	1	1	13
358 Towns	692	....	....	1	....	4	4	6	106
359 —State Reformatory for Women, Bedford	3	....	....	....	....	....	....	....	....
360 WYOMING COUNTY	**423**	....	....	....	....	....	2	**9**	**19**
361 Perry	64	....	....	....	....	....	....	3	2
362 Warsaw	67	....	....	....	....	....	....	1	6
363 Other villages	105	....	....	....	....	....	2	3	4
364 Towns	187	....	....	....	....	....	....	2	7
365 YATES COUNTY	**281**	....	....	....	....	**1**	2	**5**	**10**
366 Penn Yan	84	....	....	....	....	1	....	2	3
367 Other villages	48	....	....	....	....	....	....	1	....
368 Towns	149	....	....	....	....	....	2	2	7

in the State during 1917, *with total for other villages and towns in each important causes* — (Continued)

CAUSE OF DEATH

Pulmonary tuberculosis (28, 29)	Tuberculous meningitis (30)	Other forms of tuberculosis (31-35)	Cancer (39-45)	Diabetes (50)	Cerebrospinal meningitis (61b,c)	Acute anterior poliomyelitis (63a)	Apoplexy and cerebral hemorrhage (64)	Organic heart disease (79)	Arteriosclerosis (81)	Bronchitis (89, 90)	Pneumonia (all forms) (91, 92)	Bronchopneumonia (91)	Lobar pneumonia and unqualified (92)	
346	**45**	**32**	**279**	**53**	**3**	**4**	**294**	**479**	**58**	**55**	**474**	**156**	**318**	340
20	2	3	27	9	1	1	31	54	5	7	40	12	28	341
11	3	2	24	5	.....	.....	25	39	4	4	41	15	26	342
12	3	1	6	4	.....	.....	21	13	2	.....	18	9	9	343
1	.....	1	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	344
19	3	4	21	3	.....	.....	14	29	4	4	22	9	13	345
13	2	6	22	4	2	1	19	33	1	1	26	9	17	346
13	3	2	8	1	.....	1	12	15	4	5	36	16	20	347
118	18	7	59	14	.....	.....	82	124	13	12	163	38	125	348
3	1	.....	1	2	.....	.....	6	4	2	.....	10	3	7	349
3	2	.....	3	.....	.....	.....	5	5	.....	1	8	6	2	350
9	1	.....	9	1	.....	.....	6	16	3	1	10	2	8	351
2	.....	1	3	1	.....	.....	3	1	2	1	6	2	4	352
6	1	1	3	.....	.....	.....	1	9	.....	.....	7	3	4	353
1	.....	.....	1	.....	.....	.....	.....	6	1	.....	3	.....	3	354
4	.....	.....	4	.....	.....	.....	9	14	1	.....	11	3	8	355
3	1	.....	3	.....	.....	.....	1	8	1	.....	7	5	2	356
11	2	.....	9	1	.....	1	16	25	3	.....	16	2	14	357
98	3	5	76	8	.....	.....	43	84	12	19	50	22	28	358
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	359
11	**3**	**5**	**47**	**9**	.....	.....	**43**	**66**	**14**	**10**	**36**	**12**	**24**	360
2	.....	.....	6	.....	.....	.....	4	6	2	1	9	3	6	361
2	2	2	10	.....	.....	.....	5	13	1	.....	3	2	1	362
3	1	.....	9	2	.....	.....	15	21	3	.....	8	4	4	363
4	.....	3	22	7	.....	.....	19	26	8	9	16	3	13	364
8	.....	2	19	2	.....	.....	**41**	**56**	**3**	5	**31**	**7**	**24**	365
2	.....	1	4	.....	.....	.....	5	16	.....	2	5	.....	5	366
.....	.....	.....	3	1	.....	.....	8	10	.....	2	7	3	4	367
6	.....	1	12	1	.....	.....	28	30	3	1	19	4	15	368

Table 16 — *Number of deaths in each city and village of 2,500 and over county, classified by broad age periods and*

STATE AND SUBDIVISIONS, BY COUNTIES	Diarrhea and enteritis (under 2 years) (104)	Appendicitis (108)	Hernia, intestinal obstruction (109)	Cirrhosis of liver (113)	Nephritis and Bright's disease (119, 120)	Puerperal septicemia (137)	Other puerperal affections (134-136, 138-141)	Total diseases peculiar to early infancy (150-153)	Congenital malformations (150)
340 WESTCHESTER COUNTY	**170**	**41**	**40**	**52**	**414**	**18**	**25**	**284**	**39**
341 Mt. Vernon	12	5	6	6	55	3	.....	26	4
342 New Rochelle	14	6	2	5	29	1	.....	41	4
343 Ossining	3	3	1	.....	21	1	2	9	1
344 —Sing Sing Prison	.....	.....	.....	.....	2	.....	.....	.....	.....
345 Peekskill	11	1	1	1	19	.....	1	10	2
346 White Plains	7	7	.....	3	17	1	.....	17	1
347 Port Chester	8	1	7	5	20	.....	4	19	4
348 Yonkers	74	13	13	15	103	7	9	86	11
349 Dobbs Ferry	.....	1	.....	.....	6	.....	2	6	1
350 Hastings-on-Hudson	3	.....	1	2	7	1	1	4	2
351 Mamaroneck	9	.....	.....	2	14	.....	.....	1	.....
352 Mt. Kisco	.....	.....	.....	1	2	.....	1	4	1
353 North Tarrytown	4	.....	.....	.....	6	.....	.....	9	.....
354 Rye	5	.....	1	1	5	.....	.....	.....	.....
355 Tarrytown	3	2	2	1	6	1	1	9	.....
356 Tuckahoe	4	.....	.....	1	.....	.....	.....	3	1
357 Other villages	5	2	.....	1	14	3	.....	12	1
358 Towns	8	.....	6	8	87	.....	4	28	6
359 —State Reformatory for Women, Bedford	.....	.....	.....	.....	.....	.....	.....	3	.....
360 WYOMING COUNTY	**7**	.....	**1**	**3**	**36**	**3**	**2**	**22**	**4**
361 Perry	2	.....	.....	1	10	.....	1	4	.....
362 Warsaw	.....	.....	.....	1	3	3	1	5	2
363 Other villages	2	.....	.....	.....	7	.....	.....	5	.....
364 Towns	3	.....	1	1	16	.....	.....	8	2
365 YATES COUNTY	**4**	**2**	**2**	**2**	**21**	**1**	**2**	**16**	**3**
366 Penn Yan	4	1	1	.....	11	.....	1	2	.....
367 Other villages	.....	.....	.....	2	5	.....	.....	2	.....
368 Towns	.....	1	1	.....	5	1	1	12	3

in the State during 1917, *with total for other villages and towns in each important causes* — (Concluded)

CAUSE OF DEATH — *Concluded*												
Premature birth (151a)	Congenital debility (151b)	Other causes peculiar to early infancy (152-153)	Old age (154)	Total accidents (164-181, 185-186)	Railroad accidents (175a)	Automobile accidents (175c)	Drowning (169)	Other accidents	Suicides (155-163)	Homicides (182-184)	All other causes	
144	**33**	**62**	**18**	**252**	**17**	**48**	**29**	**158**	**48**	**12**	**560**	340
13	4	5	1	17	.....	5	.....	12	6	.....	70	341
21	4	12	7	28	.....	7	3	18	5	3	51	342
5	2	1	.....	17	1	3	1	12	.....	.....	23	343
.....	.....	.....	.....	4	.....	.....	.....	4	.....	.....	2	344
6	.....	2	.....	18	1	3	5	9	1	.....	32	345
7	3	6	1	22	2	4	.....	16	10	1	38	346
11	2	2	1	17	.....	3	2	12	2	1	27	347
44	12	19	3	61	3	10	5	43	13	4	141	348
3	1	1	.....	9	2	3	.....	4	.....	.....	7	349
2	.....	.....	.....	1	.....	.....	1	.....	3	1	4	350
1	.....	.....	.....	3	1	1	1	.....	.....	.....	14	351
1	1	1	1	4	.....	1	.....	3	.....	2	9	352
8	.....	1	.....	.....	.....	.....	.....	.....	2	.....	5	353
.....	.....	.....	1	4	1	.....	1	2	.....	.....	5	354
4	3	2	.....	3	.....	1	.....	2	1	.....	11	355
.....	.....	2	.....	1	.....	.....	.....	1	.....	.....	2	356
7	1	3	1	11	1	2	2	6	.....	.....	26	357
11	6	5	2	36	5	5	8	18	5	.....	95	358
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	359
13	**1**	**4**	**5**	**21**	**3**	**2**	**1**	**15**	**7**	.....	**61**	360
4	.....	.....	.....	3	.....	1	.....	2	1	.....	9	361
2	.....	1	.....	2	1	.....	.....	1	1	.....	12	362
4	.....	1	.....	5	1	.....	.....	4	2	.....	17	363
3	1	2	5	11	1	1	1	8	3	.....	23	364
10	**1**	**2**	**6**	**11**	**1**	.....	**1**	**9**	**6**	**1**	**32**	365
1	1	.....	3	3	1	.....	.....	2	3	.....	17	366
2	.....	.....	2	1	.....	.....	.....	1	.....	.....	4	367
7	.....	2	1	7	.....	.....	1	6	3	1	11	368

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

NOTE.— Deaths occurring in State institutions have been entered separately at end of each have been based upon all deaths occurring therein. Where institutions are located in rural been thought expedient to represent the deaths of these rural districts as exclusive of institution

[District number is obtained by prefixing County Number to Number before such district,

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
01 ALBANY COUNTY	173,666	**183,330**	**3,755**	**136**	**3,194**	**3,618**	**434**	**156**	**1289**	**417**	**22**
01 Albany, city	100,253	**107,979**	**2,254**	**97**	**2,029**	**2,207**	**245**	**96**	**787**	**138**	**13**
02 Cohoes, city	24,709	**23,433**	**571**	**8**	**435**	**219**	**85**	**22**	**141**	**9**	**3**
03 Watervliet, city	15,074	**14,990**	**316**	**10**	**246**	**402**	**47**	**11**	**95**	**203**	**1**
50 Berne	1,753	1,638	22	...	21	13	1	....	17	....	...
51 Bethlehem	4,413	5,590	44	2	71	105	5	....	42	16	...
52 Coeymans	4,252	2,881	60	3	33	35	2	3	23	10	1
23 Ravena, village	.....	*1,700*	*55*	*1*	*20*	*54*	*4*	*2*	*6*	*5*	*1*
53 Colonie	8,385	9,989	204	10	116	140	23	13	44	18	...
(54 Green Island)*	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	...
20 Green Island, village	*4,737*	*4,533*	*96*	*3*	*60*	*237*	*9*	*5*	*29*	*6*	...
55 Guilderland	2,659	2,885	40	...	39	5	2	2	25	....	...
21 Altamont, village	*674*	*805*	*9*	*1*	*12*	*10*	.....	.....	*9*	*2*	*1*
56 Knox	1,007	1,101	15	...	14	11	1	....	7	....	...
57 New Scotland	2,301	2,374	23	...	31	41	2	2	23	4	1
22 Voorheesville, village	*533*	*550*	*6*	...	*11*	*3*	*1*	....	*3*	....	...
58 Rensselaerville	1,609	1,619	21	...	31	82	3	....	20	6	1
59 Westerlo	1,307	1,263	19	1	25	54	4	....	18	....	...
02 ALLEGANY COUNTY	41,412	**40,216**	**689**	**26**	**589**	**1,215**	**54**	**16**	**355**	**38**	**4**
50 Alfred	831	818	12	...	13	18	.....	.....	10	....	...
20 Alfred, village	*759*	*677*	*5*	...	*8*	*13*	*1*	*1*	*5*	....	...
51 Allen	598	627	14	...	5	8	2	1	2	....	...
52 Alma	973	752	13	...	7	1	1	1	4	1	...
53 Almond	1,297	1,279	16	...	21	23	1	1	13	....	...
54 Amity	977	984	14	1	13	40	1	....	8	4	...
21 Belmont, village	*1,094*	*1,031*	*21*	*1*	*20*	*61*	*1*	....	*10*	....	...
55 Andover	854	859	19	1	9	81	1	....	6	....	...
22 Andover, village	*1,136*	*1,154*	*23*	...	*27*	*196*	*2*	*1*	*14*	....	...
56 Angelica	612	580	9	...	27	6	.....	.....	20	....	...
23 Angelica, village	*1,056*	*1,138*	*18*	...	*14*	*53*	*2*	....	*9*	....	...
57 Belfast	1,773	1,477	24	1	10	17	1	....	4	1	...
58 Birdsall	568	564	7	1	6	3	.....	.....	4	....	...
59 Bolivar	964	920	16	2	15	28	3	1	8	3	1
24 Bolivar, village	*1,318*	*1,260*	*21*	...	*14*	*11*	*1*	*1*	*8*	*2*	...
60 Burns	770	621	4	...	11	23	1	....	10	....	...
25 Canaseraga, village	*754*	*668*	*12*	...	*13*	*11*	.....	.....	*11*	....	...
61 Caneadea	1,354	1,124	28	1	15	21	.....	.....	12	....	...
30 Oramel, village	.....	*126*	.....	...	.....	.....	.....	.....	.....	.....	...
62 Centerville	781	813	16	...	9	5	2	....	4	....	...
63 Clarksville	794	743	11	1	3	15	.....	.....	.....	.....	...
64 Cuba	875	731	13	...	8	12	2	....	5	....	...
26 Cuba, village	*1,556*	*1,645*	*17*	...	*26*	*22*	*2*	....	*18*	*1*	...
65 Friendship	882	851	7	1	6	17	1	....	5	1	...
27 Friendship, village	*1,218*	*1,199*	*13*	...	*14*	*50*	....	2	11	....	...
66 Genesee	1,105	1,061	20	...	12	2	1	....	7	....	...
67 Granger	708	709	14	1	10	.....	1	1	4	....	...
68 Grove	740	752	20	...	11	7	3	....	6	....	...
69 Hume	1,736	1,915	35	2	31	61	2	....	22	1	...
70 Independence	1,202	1,177	24	...	17	6	3	....	12	....	...
71 New Hudson	852	762	17	2	18	17	3	2	9	....	...
72 Rushford	1,260	1,326	19	1	20	115	4	1	11	1	...
73 Scio	1,196	1,064	19	2	15	3	1	....	10	1	...
74 Ward	496	506	4	...	6	14	1	....	3	....	...
75 Wellsville	1,281	1,261	11	1	18	20	1	1	10	10	...
28 Wellsville, village	*4,382*	*4,595*	*98*	*6*	*93*	*223*	*8*	*2*	*45*	*10*	*3*
76 West Almond	458	462	9	...	6	4	.....	.....	2	....	...
77 Willing	993	924	31	1	10	1	1	....	7	....	...
78 Wirt	758	681	11	...	4	4	.....	.....	4	1	...
29 Richburg, village	*451*	*380*	*4*	...	*4*	*3*	....	....	*2*	*1*	...

* Coterminous with

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917**

county. For cities these are included in the city totals because in previous tables rates for cities districts (towns or villages) the totals of these deaths in many instances are so great that it has deaths.

e. g. 101=Albany city; cities (c.) in bold face, villages (v.) in *italics*, towns in Roman type.]

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
1308	**38**	**230**	....	**238**	**9**	**138**	**16**	**480**	**299**	**24**	**36**	**234**	**92**	**783**	**2448**	**01**
711	**34**	**132**	....	**105**	**2**	**77**	**10**	**384**	**212**	**20**	**26**	**159**	**44**	**640**	**1529**	**01**
59	**1**	**5**	....	**64**	**5**	**15**	**2**	**38**	**36**	**1**	**7**	**27**	**27**	**28**	**327**	**02**
101	....	**28**	....	**20**	....	**14**	**3**	**18**	**18**	**1**	....	**18**	**10**	**17**	**196**	**03**
2	....	....	....	4	....	....	....	....	....	....	....	2	.....	7	19	50
39	....	6	....	5	....	3	....	10	5	1	1	3	.....	25	62	51
20	....	1	....	....	....	....	....	1	.....	....	....	4	1	3	27	52
21	....	*7*	....	....	....	*11*	*1*	*5*	*3*	....	....	*1*	*3*	*5*	*11*	*23*
53	1	24	....	9	....	13	....	5	8	1	2	5	6	17	94	53
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	54
165	*2*	*25*	....	*4*	....	*4*	....	*7*	*6*	.....	....	*5*	*1*	*26*	*46*	*20*
1	....	....	....	....	....	....	....	4	4	.....	....	2	.....	.....	33	55
5	....	*1*	....	....	....	....	....	*2*	*2*	.....	....	.....	.....	.....	*9*	*21*
8	....	1	....	....	....	....	....	1	2	.....	....	2	.....	1	10	56
24	....	....	....	8	1	1	....	3	1	.....	....	1	.....	1	27	57
2	....	....	....	....	....	....	....	*1*	*1*	.....	....	.....	.....	.....	10	*22*
61	....	....	....	1	....	....	....	1	1	.....	....	4	.....	13	25	58
36	....	....	....	18	1	....	....	.....	.....	.....	....	1	.....	.....	23	59
338	**1**	**42**	....	**435**	**2**	**23**	**1**	**23**	**21**	**1**	**7**	**44**	**6**	**315**	**503**	**02**
13	....	2	....	....	....	....	....	.....	.....	.....	1	2	.....	3	10	50
13	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	*8*	*20*
8	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	5	51
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	7	52
1	....	....	....	21	....	....	....	.....	1	.....	1	2	.....	1	17	53
7	....	....	....	19	1	....	....	2	.....	.....	....	1	.....	8	11	54
3	....	....	....	*29*	....	....	....	.....	.....	.....	....	4	.....	*29*	*16*	*21*
61	1	....	....	1	....	1	....	1	.....	.....	....	.....	.....	17	8	55
128	....	....	....	*2*	....	*6*	....	*3*	*5*	.....	....	*1*	*1*	*57*	*20*	*22*
3	....	1	....	1	....	....	....	1	1	.....	....	1	.....	.....	25	56
2	....	....	....	*26*	....	....	....	.....	.....	.....	*2*	.....	.....	*25*	*12*	*23*
5	....	1	....	4	....	....	....	1	1	.....	....	1	.....	5	8	57
....	....	....	....	3	....	....	....	.....	.....	.....	....	2	.....	.....	4	58
8	....	3	....	5	....	1	....	.....	.....	.....	....	2	.....	8	12	59
2	....	*4*	....	*2*	....	*1*	....	.....	.....	.....	....	*2*	*1*	.....	*11*	*24*
20	....	....	....	2	....	1	....	.....	.....	.....	....	.....	.....	.....	11	60
5	....	....	....	*1*	....	....	....	*2*	*1*	.....	....	*1*	.....	*3*	*11*	25
19	....	1	....	1	....	....	....	.....	.....	.....	....	.....	.....	.....	15	61
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	....	*30*
1	....	....	....	1	....	....	....	.....	.....	.....	....	.....	.....	3	9	62
....	....	2	....	12	....	1	....	.....	.....	.....	....	1	.....	.....	2	63
....	....	....	....	10	....	....	....	2	.....	.....	....	1	.....	.....	7	64
2	....	*1*	....	*15*	....	....	....	.....	.....	.....	....	.....	*1*	*3*	*25*	*26*
4	....	1	....	5	....	....	....	1	.....	.....	....	.....	.....	5	6	65
....	....	7	....	*26*	....	*1*	....	.....	.....	.....	....	*2*	.....	*16*	*12*	*27*
1	....	....	....	....	....	1	....	.....	.....	.....	....	1	.....	.....	11	66
....	....	....	....	....	....	....	....	.....	.....	.....	1	.....	.....	.....	9	67
1	....	....	....	4	....	....	....	1	.....	.....	....	.....	.....	1	11	68
2	....	6	....	14	....	2	1	3	.....	.....	....	2	.....	33	28	69
6	....	....	....	....	....	....	....	.....	.....	.....	....	2	.....	.....	15	70
1	....	4	....	1	....	....	....	2	2	.....	....	2	.....	9	14	71
....	....	....	....	61	....	....	....	.....	3	.....	1	2	.....	53	14	72
2	....	....	....	....	....	....	....	.....	2	.....	....	4	.....	.....	9	73
8	....	1	....	4	1	....	....	1	.....	.....	....	.....	.....	.....	5	74
....	....	....	....	4	....	....	....	.....	.....	.....	....	1	.....	6	17	75
8	....	*7*	....	*160*	....	*6*	....	*1*	*2*	*1*	*1*	*7*	*3*	*30*	*7*	*28*
2	....	....	....	....	....	....	....	2	2	.....	....	.....	.....	.....	4	76
1	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	10	77
1	....	....	....	1	....	1	....	.....	1	.....	....	.....	.....	.....	3	78
....	....	*1*	....	....	....	*1*	....	.....	.....	.....	....	.....	.....	.....	*4*	*29*

Green Island, village.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
03 BROOME COUNTY	78,809	**90,661**	**2,653**	**92**	**1,928**	**3,445**	**249**	**117**	**799**	**24**	**9**
01 Binghamton, city	48,443	**53,688**	**1,607**	**60**	**1,226**	**2,140**	**170**	**75**	**449**	**12**	**7**
50 Barker	948	987	15	...	9	29	1	...	7	...	...
51 Binghamton	675	731	9	1	6	2	1	...	1	...	...
52 Chenango	1,237	1,273	25	1	17	33	2	...	9	...	...
53 Colesville	2,415	2,525	46	...	41	16	3	...	31	...	...
54 Conklin	850	942	14	...	15	21	...	1	9	...	...
55 Dickinson	395	639	35	2	79	14	6	2	44	...	...
20 Port Dickinson, village	*437*	*583*	*9*	*1*	*6*	*95*	*1*	...	*1*	*5*	...
56 Fenton	1,050	1,240	23	...	19	40	1	1	12	5	...
57 Kirkwood	852	942	15	...	18	10	1	...	13	...	...
58 Lisle	1,100	1,130	12	1	24	31	...	...	18	1	...
21 Lisle, village	*329*	*347*	*4*	...	*6*	*16*	...	...	*6*	...	...
59 Maine	1,363	1,339	30	1	23	12	2	2	15	...	...
60 Nanticoke	536	549	7	...	2	2	...	...	1	...	...
61 Sanford	1,836	1,779	26	...	25	102	2	2	16	1	...
22 Deposit, village	(*pt.1,144*	*1,026*)	*18*	...	*14*	*148*	...	*1*	*7*	...	...
[*22*Deposit, village (1255)*	*1,864*	*1,779*]	*33*	*3*	*35*	*246*	*2*	*2*	*18*	...	...
62 Triangle	856	873	16	...	16	19	...	...	12	...	...
23 Whitney Point, village	*744*	*760*	*13*	*2*	*13*	*16*	...	...	*9*	...	...
63 Union	1,759	2,333	76	2	34	37	7	2	10	...	...
24 Endicott, village	*2,408*	*5,581*	*304*	*10*	*94*	*243*	*27*	*14*	*20*	*5*	...
25 Johnson City, village	*3,775*	*5,400*	*211*	*9*	*126*	*285*	*13*	*11*	*45*	...	...
26 Union, village	*1,544*	*1,922*	*65*	*2*	*47*	*73*	*4*	*4*	*17*	*1*	*2*
64 Vestal	1,618	1,688	30	...	28	30	3	2	15	...	...
65 Windsor	1,858	1,719	36	...	26	18	3	...	18	...	...
27 Windsor, village	*637*	*663*	*9*	...	*16*	*13*	*2*	...	*10*	...	...
01 Binghamton State Hospital			...	...	214	...	...	...	108	...	...
04 CATTARAUGUS COUNTY	65,919	**72,756**	**1,413**	**62**	**1,015**	**928**	**116**	**38**	**502**	**15**	**2**
01 Olean, city	14,743	**17,925**	**513**	**23**	**267**	**248**	**44**	**15**	**95**	**5**	**1**
02 Salamanca, city	6,322	**8,376**	**174**	**11**	**120**	**34**	**12**	**8**	**43**	**2**	...
50 Allegany	2,112	2,029	30	3	37	9	1	1	17	...	...
20 Allegany, village	*1,286*	*1,327*	*17*	...	*13*	*17*	...	*1*	*8*	...	...
51 Ashford	1,557	1,524	20	1	17	3	2	...	12	...	...
52 Carrolton	832	797	8	...	19	...	3	...	3	...	...
21 Limestone, village	*684*	*465*	*7*	...	*4*	*5*	*1*	...	*1*	...	...
53 Cold Spring	898	722	14	...	11	2	3	...	7	...	...
54 Conewango	913	954	17	...	6	10	2	1	2	...	...
22 East Randolph, village (78)	*593*	*582*	*4*	...	*8*	*8*	...	...	*7*	...	...
55 Dayton	1,710	1,776	18	...	20	5	...	...	15	...	...
30 South Dayton, village	...	...	*15*	*1*	*7*	*5*	...	...	*4*	...	...
56 East Otto	1,093	1,062	17	...	12	11	1	...	7	...	...
57 Elko	475	302	2	...	2	23	...	...	1	...	...
58 Ellicottville	1,082	963	20	2	9	14	2	1	6	...	...
23 Ellicottville, village	*985*	*881*	*15*	*3*	*12*	*35*	*1*	...	*4*	...	...
59 Farmersville	948	976	22	...	16	9	3	...	9	...	...
60 Franklinville	1,095	1,109	15	2	21	4	1	1	13	...	...
24 Franklinville, village	*1,568*	*2,065*	*36*	*2*	*24*	*11*	*3*	*1*	*16*	...	...
61 Freedom	1,159	1,124	12	2	15	16	1	...	12	...	...
62 Great Valley	2,236	1,513	17	1	24	27	1	1	16	1	...
63 Hinsdale	1,125	1,090	11	...	12	36	3	...	5	2	...
64 Humphrey	626	625	6	1	7	3	...	...	6	...	...
65 Ischua	803	775	13	...	6	15	...	...	5	...	...
66 Leon	859	925	22	...	17	1	4	1	8	...	...
67 Little Valley	537	529	6	...	4	4	...	...	3	2	...
25 Little Valley, village	*1,368*	*1,307*	*19*	...	*25*	*25*	*1*	...	*14*	*2*	*1*
68 Lyndon	603	549	14	...	3	...	1	...	...	...	...
69 Machias	1,529	1,575	31	2	40	8	2	...	26	...	...
70 Mansfield	912	867	8	...	11	2	...	1	7	...	...
71 Napoli	741	783	11	1	13	14	...	1	8	...	...
72 New Albion	824	876	15	1	16	1	2	...	10	...	...
26 Cattaraugus, village	*1,165*	*1,276*	*16*	...	*18*	*23*	*1*	...	*13*	...	...
73 Olean	885	1,324	28	1	19	10	3	2	9	1	...

* Deposit, village, located in two counties, Broome

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles, 6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
1241	**11**	**506**	**7**	**651**	**20**	**524**	**40**	**127**	**96**	**1**	**24**	**108**	**72**	**371**	**1541**	**03**
748	**7**	**219**	**2**	**502**	**13**	**349**	**24**	**104**	**84**	.....	**19**	**69**	**50**	**206**	**951**	**01**
12	....	....	....	12	....	2	....	.....	.....	.....	....	....	.....	3	9	50
....	....	1	....	....	....	1	1	.....	.....	.....	....	....	.....	.....	5	51
21	....	3	....	2	....	1	1	.....	.....	.....	....	1	.....	6	15	52
7	....	4	....	1	....	4	....	.....	.....	.....	....	1	1	.....	39	53
15	....	4	....	....	....	2	1	.....	.....	.....	....	....	.....	.....	14	54
5	....	3	....	....	1	6	....	.....	2	.....	2	1	.....	.....	73	55
48	....	*1*	....	*40*	....	*4*	....	.....	.....	.....	....	....	.....	.....	6	*20*
2	....	18	....	7	1	3	....	1	.....	.....	....	....	.....	4	18	56
6	....	2	....	....	....	2	1	.....	.....	.....	....	2	1	.....	14	57
14	....	....	....	15	....	1	....	.....	.....	.....	....	2	.....	.....	22	58
4	....	*1*	....	7	....	....	....	.....	.....	.....	....	*3*	.....	*4*	*3*	*21*
4	....	1	....	3	2	4	....	.....	.....	.....	....	4	.....	.....	17	59
2	....	....	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	1	60
64	1	12	....	1	....	....	....	1	.....	.....	....	1	.....	23	23	61
112	....	*6*	....	....	....	....	....	*1*	*1*	.....	....	*2*	.....	*29*	*11*	*22*
183	*1*	*6*	....	....	....	....	....	*2*	*2*	.....	....	*2*	.....	*55*	*30*	**22*
19	....	....	....	....	....	....	....	.....	.....	.....	....	3	.....	.....	13	62
14	....	....	....	*1*	....	*1*	....	.....	.....	.....	....	*2*	.....	.....	11	*23*
4	1	16	....	2	1	12	2	1	.....	.....	....	3	3	2	24	63
23	*1*	*107*	*2*	*5*	*1*	*29*	*3*	*10*	*5*	*1*	....	*1*	*11*	*66*	*70*	*24*
103	*1*	*37*	*1*	*51*	*1*	*66*	*5*	*5*	.....	*3*	*7*	*2*	*23*	*106*	*25*
6	....	*38*	*2*	*1*	....	*22*	*1*	*2*	*2*	.....	....	....	*2*	*3*	*36*	*26*
1	....	18	....	1	....	8	....	.....	1	.....	....	1	1	2	25	64
4	....	7	....	....	....	6	1	1	.....	.....	....	3	1	.....	21	65
3	....	*8*	....	....	....	*1*	....	*1*	*1*	.....	....	*1*	.....	.....	14	*27*
2	1	....	....	....	....	....	....	7	28	.....	....	2	.....	.....	183	01
323	**4**	**101**	....	**126**	**3**	**70**	**7**	**58**	**48**	**3**	**6**	**73**	**14**	**232**	**858**	**04**
37	....	**37**	....	**79**	**2**	**42**	**4**	**24**	**4**	.....	**1**	**19**	**4**	**24**	**232**	**01**
18	....	**4**	....	**1**	....	**2**	**1**	**3**	**6**	.....	**1**	**8**	**5**	**4**	**99**	**02**
6	....	1	....	....	....	1	....	1	15	.....	....	3	.....	.....	19	50
1	....	*4*	....	*2*	....	*4*	....	*3*	*2*	*1*	*1*	....	.....	*2*	*10*	*20*
1	....	....	....	....	....	....	....	.....	.....	.....	....	3	.....	2	14	51
....	....	....	....	....	....	....	....	.....	.....	.....	....	1	1	.....	17	52
....	....	....	....	....	....	*5*	....	.....	.....	*1*	*1*	....	.....	.....	*2*	*21*
....	....	2	....	....	....	....	....	1	.....	.....	....	....	.....	.....	10	53
4	....	....	....	5	1	....	....	.....	.....	.....	....	....	.....	1	5	54
1	....	*1*	....	*2*	....	....	....	.....	.....	.....	....	....	.....	*4*	*8*	*22*
....	....	2	....	2	....	....	....	1	1	.....	....	1	.....	.....	18	55
1	....	....	....	....	....	....	....	.....	.....	.....	....	*1*	.....	*4*	*6*	*30*
7	....	....	....	....	....	1	....	.....	.....	.....	....	2	.....	3	10	56
23	1	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	1	57
10	....	3	....	....	....	....	....	1	.....	.....	....	2	.....	.....	7	58
35	....	*3*	....	....	....	....	....	*1*	*1*	.....	....	*1*	.....	.....	*10*	*23*
....	....	6	....	....	....	....	....	3	1	.....	....	1	.....	.....	14	59
1	....	....	....	....	....	....	....	1	.....	.....	....	....	.....	2	21	60
2	....	....	....	....	....	*1*	....	*2*	.....	*1*	*1*	*1*	.....	*5*	*22*	*24*
15	....	1	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	14	61
12	....	....	....	5	....	....	....	1	2	.....	....	1	1	8	20	62
26	1	....	....	7	....	....	....	1	.....	.....	....	....	.....	.....	11	63
1	....	1	....	....	....	1	....	.....	.....	.....	....	1	.....	.....	6	64
12	1	....	....	3	....	....	....	.....	.....	.....	....	1	.....	.....	4	65
1	....	....	....	....	....	....	....	.....	1	.....	....	....	.....	.....	16	66
1	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	1	4	67
11	....	*1*	....	....	....	....	....	*4*	*2*	.....	....	*1*	.....	*5*	*21*	*25*
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	3	68
....	7	....	....	....	....	....	....	.....	.....	.....	....	4	.....	1	36	69
....	....	....	....	1	....	1	1	.....	.....	.....	....	1	.....	.....	9	70
1	....	8	....	....	....	....	....	1	.....	.....	....	....	.....	4	13	71
....	....	1	....	....	....	....	....	.....	1	.....	....	2	.....	.....	13	72
3	....	....	....	*1*	....	....	....	*3*	*1*	.....	....	*1*	.....	*16*	*16*	*26*
3	....	4	....	1	....	1	....	.....	.....	.....	....	2	.....	.....	17	73

and Delaware. Total for entire village given in bracketed line.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (stillbirths excluded)		Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
				Stillbirths			Under 1	1 to 4	60 years and over	Cases	Deaths
CATTARAUGUS COUNTY—(*Concluded*)											
74 Otto	922	839	21	...	11	.....	2	....	5	....	...
75 Perrysburg	1,184	1,123	12	2	19	11	2	1	7	....	...
(76 Persia)	381	†	9	...	5	1	....	....	2	....	...
(27) Gowanda, village	*(pt. 1,349*	*1,800)*	*43*	...	*30*	*17*	*8*	....	*12*	....	...
[27 Gowanda, village (1458)*	*2,012*	*2,524]*	*48*	...	*37*	*24*	*8*	....	*15*	*1*	...
77 Portville	1,613	1,690	21	...	18	16	3	1	11	....	...
28 Portville, village	*758*	*765*	*17*	...	*10*	*11*	....	*1*	*5*	....	...
78 Randolph (22)	780	843	14	1	7	8	....	....	6	....	...
29 Randolph, village	*1,298*	*1,341*	*23*	*1*	*14*	*13*	....	....	*10*	....	...
79 Red House	781	700	8	...	6	.....	....	....	3	....	...
80 Salamanca	438	414	7	1	11	1	....	....	6	....	...
81 South Valley	584	497	7	...	8	1	....	....	7	....	...
82 Yorkshire	1,563	1,082	18	...	10	25	2	....	6	....	...
31 Delevan, village	.....	*557*	*11*	...	*10*	*74*	*1*	....	*9*	....	...
32 Perrysburg, village	.....	.....	*9*	...	*1*	*2*	....	....	*1*	....	...
Indian Reservations‡	.....	2,146	.....	...	.....	108	....	....	....	....	...
05 CAYUGA COUNTY	67,106	**66,064**	**1,297**	**58**	**1,051**	**707**	**100**	**37**	**609**	**19**	**3**
01 Auburn, city	34,668	**32,468**	**832**	**41**	**547**	**161**	**70**	**24**	**259**	**10**	**2**
50 Aurelius	1,089	1,096	19	...	10	9	....	....	7	....	...
20 Cayuga, village	*348*	*373*	*7*	...	*13*	*9*	*2*	....	9	....	...
51 Brutus	877	990	19	1	18	36	....	....	17	....	...
21 Weedsport, village	*1,344*	*1,448*	*14*	...	*29*	*70*	....	....	*21*	....	...
52 Cato	1,131	1,198	21	1	11	30	2	....	8	1	...
22 Cato, village (56)	*374*	*390*	*6*	...	*5*	*28*	....	....	*4*	....	...
23 Meridian, village	*326*	*313*	*3*	...	*6*	*1*	....	....	*5*	....	...
53 Conquest	1,103	1,225	21	1	9	7	....	....	8	....	...
54 Fleming	1,017	1,031	14	...	14	28	1	....	10	....	...
55 Genoa	1,866	1,853	22	...	34	6	3	....	26	1	...
56 Ira (22)	1,189	1,467	15	...	12	13	1	2	7	1	...
57 Ledyard	1,226	1,233	16	3	19	2	1	....	14	....	...
24 Aurora, village	*493*	*396*	*1*	...	*7*	.....	*1*	....	*3*	....	...
58 Locke	864	843	7	...	19	30	1	....	11	....	...
59 Mentz	824	876	8	...	10	3	....	1	8	....	...
25 Port Byron, village	*1,085*	*1,115*	*22*	...	*22*	*50*	*2*	*1*	*13*	*1*	...
60 Montezuma	941	914	13	2	17	12	....	2	12	1	...
61 Moravia	836	846	9	1	13	9	1	....	8	....	...
26 Moravia, village	*1,324*	*1,393*	*14*	...	*31*	*70*	....	*1*	*24*	*1*	...
62 Niles	1,209	1,254	18	1	16	18	2	1	10	....	...
63 Owasco	1,393	1,503	17	...	20	21	2	....	13	1	...
64 Scipio	1,470	1,417	18	...	15	3	1	....	8	....	...
65 Sempronius	756	743	10	1	12	2	....	1	9	....	...
66 Sennett	1,423	1,481	20	1	40	20	2	1	28	....	...
67 Springport	649	740	9	...	5	4	1	....	3	1	...
27 Union Springs, village	*798*	*762*	*7*	*1*	*9*	*3*	....	....	*8*	....	...
68 Sterling	1,788	1,845	25	...	19	15	1	....	15	1	1
28 Fairhaven, village	*571*	*624*	*8*	*1*	*11*	*4*	....	....	*6*	....	...
69 Summer Hill	613	604	10	...	6	.....	1	....	3	....	...
70 Throop	960	963	17	1	18	1	1	1	11	....	...
71 Venice	1,343	1,402	32	2	17	12	4	1	9	....	...
72 Victory	1,208	1,258	23	...	17	30	....	1	12	....	...
01 Auburn Prison	.....	.....	.....	...	9	.....	....	....	2	....	...
06 CHAUTAUQUA COUNTY	105,126	**116,818**	**2,427**	**86**	**1,623**	**2,994**	**216**	**70**	**760**	**57**	**4**
01 Dunkirk, city	17,221	**17,870**	**594**	**15**	**311**	**455**	**62**	**27**	**98**	**7**	**1**
02 Jamestown, city	31,297	**37,780**	**850**	**27**	**525**	**1,157**	**72**	**27**	**192**	**17**	**2**
50 Arkwright	843	843	10	...	10	30	1	....	6	....	...
51 Busti	1,572	1,649	21	1	18	14	2	....	12	....	...
20 Lakewood, village	*564*	*702*	*1*	*1*	*6*	*23*	....	....	*3*	*1*	...
52 Carroll	1,564	1,714	26	1	28	9	3	1	16	2	...
53 Charlotte	783	801	10	...	8	22	....	....	6	....	...

* Gowanda, village, located in two counties, Cattaraugus and Erie. Total for entire village given

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 30–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
....	....	....	....	....	....	....	....	....	....	....	....	1	.....	.....	10	74
....	....	....	....	....	....	....	....	1	5	.....	....	1	.....	10	13	75
....	....	....	....	....	....	1	....	.....	.....	.....	....	1	.....	.....	4	76
....	....	*?*	....	*3*	....	*1*	....	*3*	*3*	.....	....	....	*2*	*3*	*25*	*27*
1	....	*?*	....	*5*	....	*2*	....	*4*	*4*	.....	....	....	*2*	*4*	*31*	**27*
5	....	.....	....	3	....	4	....	2	.....	.....	....	2	.....	2	16	77
....	....	....	....	....	....	*1*	....	*1*	.....	.....	....	*2*	.....	*9*	*8*	*28*
....	....	....	....	2	....	.....	....	.....	.....	.....	....	.....	.....	6	7	78
....	....	....	....	*8*	....	*1*	....	*1*	.....	*1*	....	*1*	.....	*2*	*13*	*29*
....	....	....	....	....	....	....	....	.....	2	.....	....	2	.....	.....	2	79
1	1	....	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	9	80
....	....	....	....	....	....	1	1	.....	.....	.....	1	1	.....	.....	5	81
21	....	2	....	....	....	2	....	.....	.....	.....	....	1	.....	.....	9	82
65	....	*5*	....	....	....	....	....	.....	.....	.....	....	*1*	*1*	*6*	*8*	*31*
....	....	*1*	....	*1*	....	....	....	.....	.....	.....	....	....	.....	.....	*1*	*32*
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	108	....	
373	**2**	**94**	....	**33**	**1**	**69**	**10**	**30**	**51**	**2**	**2**	**88**	**29**	**87**	**865**	**05**
38	....	**43**	....	.....	.....	**47**	**8**	**17**	**35**	.....	**1**	**50**	**22**	**6**	**429**	**01**
....	....	8	....	....	....	....	....	.....	1	.....	....	....	.....	1	9	50
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	*9*	*13*	*20*
24	....	3	....	1	....	....	....	.....	.....	.....	....	3	.....	8	15	51
62	....	*3*	....	....	....	*2*	*1*	*3*	*1*	.....	....	*2*	.....	.....	*25*	*21*
6	....	10	....	....	....	3	....	1	.....	.....	....	1	.....	9	10	52
5	....	*2*	....	*7*	....	*5*	....	.....	.....	.....	....	....	.....	*9*	*5*	*22*
....	....	*1*	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	*6*	*23*
2	....	4	....	....	....	....	....	1	.....	.....	....	1	.....	.....	8	53
3	....	....	....	1	....	1	....	.....	.....	.....	....	1	.....	23	13	54
2	....	....	....	....	....	....	....	2	1	1	....	9	2	.....	22	55
11	....	....	....	....	....	1	....	.....	2	.....	....	....	.....	.....	10	56
....	....	2	....	....	....	....	....	.....	.....	.....	....	2	.....	.....	17	57
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	*?*	*24*
30	1	....	....	....	....	....	....	.....	2	.....	....	3	1	.....	12	58
2	....	1	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	9	59
49	....	....	....	....	....	....	....	.....	*2*	.....	....	*3*	*1*	.....	*16*	*25*
2	....	....	....	....	....	7	1	1	.....	.....	....	....	.....	1	16	60
7	....	1	....	....	....	1	....	.....	.....	.....	....	1	.....	.....	12	61
64	....	....	....	*4*	....	....	....	*1*	.....	.....	....	....	.....	.....	*31*	*26*
16	....	1	....	....	....	....	....	1	.....	.....	....	....	.....	.....	16	62
14	....	3	....	....	....	....	....	2	3	.....	....	2	1	1	14	63
2	....	....	....	1	....	....	....	.....	.....	.....	....	....	.....	.....	15	64
2	....	....	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	11	65
6	1	8	....	....	....	1	....	.....	1	.....	....	4	.....	5	34	66
....	....	1	....	....	....	....	....	.....	.....	.....	....	....	.....	2	5	67
2	....	....	....	....	....	....	....	.....	.....	.....	....	*2*	.....	*1*	*7*	*27*
10	....	1	....	1	....	1	....	.....	1	.....	....	....	1	1	16	68
1	....	....	....	....	....	....	....	.....	*1*	*1*	....	....	.....	*2*	*10*	*28*
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	6	69
....	....	....	....	....	....	....	....	1	1	.....	1	1	1	.....	14	70
4	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	8	17	71
9	....	2	....	18	1	....	....	.....	.....	.....	....	1	.....	1	15	72
....	....	....	....	....	....	....	....	.....	1	.....	....	....	.....	.....	....	01
668	**5**	**184**	**4**	**620**	**19**	**185**	**5**	**107**	**95**	**1**	**19**	**102**	**29**	**1,172**	**1341**	**06**
43	....	**9**	....	**190**	**8**	**32**	**1**	**12**	**16**	.....	**5**	**10**	**10**	**162**	**260**	**01**
278	**2**	**72**	**2**	**182**	**4**	**106**	**3**	**58**	**44**	**1**	**11**	**48**	**6**	**443**	**403**	**02**
2	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	28	10	50
3	....	1	....	....	....	5	....	.....	1	.....	....	2	.....	5	15	51
4	....	*1*	*1*	*6*	....	....	....	.....	.....	.....	....	*2*	.....	*11*	*8*	*20*
5	....	1	....	....	....	1	....	.....	.....	.....	....	1	.....	.....	27	52
1	....	2	....	14	....	....	....	.....	.....	.....	....	....	.....	5	8	53

[i]n bracketed line. † Included in the village of Gowanda. ‡ Distributed by towns in U. S. Census.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (stillbirths excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
CHAUTAUQUA COUNTY—(*Concluded*)											
21 Sinclairville, village (62)	*542*	*582*	*6*	*4*	*13*	*5*	*1*	....	*10*	....	....
54 Chautauqua	2,393	2,732	25	2	57	12	1	....	41	....	....
22 Mayville, village	*1,123*	*1,201*	*11*	*1*	*6*	*4*	....	....	*3*	....	....
34 Chautauqua, village	.....	.....	*3*	....	*5*	*14*	....	....	*5*	*1*	....
55 Cherry Creek	774	910	7	....	6	6	....	....	4	....	....
23 Cherry Creek, village	*606*	*720*	*5*	....	*4*	*8*	*1*	....	*2*	....	....
56 Clymer	1,164	1,341	27	2	16	.....	1	....	11	....	....
57 Dunkirk	429	.....	11	....	3	.....	....	....	1	....	....
58 Ellery	1,695	1,606	22	3	25	21	....	....	15	1	....
33 Bemus Point, village	.....	*270*	.....	....	*3*	*1*	....	....	*1*	....	....
59 Ellicott	1,611	2,154	18	1	20	11	3	1	10	....	....
24 Celeron, village	*619*	*720*	*18*	....	*7*	*1*	*2*	....	*4*	*1*	....
25 Falconer, village	*2,141*	*2,342*	*58*	....	*22*	*129*	*3*	*1*	*11*	*5*	....
60 Ellington	1,235	1,317	14	1	12	5	....	....	9	....	....
61 French Creek	882	941	16	....	6	1	2	....	3	....	....
62 Gerry (21)	1,088	1,119	13	....	21	15	3	....	15	....	....
63 Hanover	2,437	2,505	57	2	26	67	5	....	12	1	....
26 Forestville, village	*721*	*740*	*8*	....	*10*	*24*	*1*	....	*9*	....	....
27 Silver Creek, village	*2,512*	*3,220*	*83*	*4*	*32*	*73*	*5*	*1*	*14*	*3*	....
64 Harmony	2,510	2,720	42	1	41	106	5	1	20	4	1
28 Panama, village	*337*	*352*	*5*	....	*7*	*42*	....	....	*7*	....	....
65 Kiantone	520	641	7	....	9	5	1	1	4	....	....
66 Mina	1,033	1,021	11	....	15	26	....	....	8	1	....
67 Poland	1,447	1,442	19	....	18	10	1	....	11	....	....
68 Pomfret	2,024	2,207	34	....	26	72	1	....	18	1	....
29 Fredonia, village	*5,285*	*5,328*	*112*	*6*	*80*	*295*	*11*	*4*	*43*	*6*	....
69 Portland	1,877	2,060	34	4	33	31	6	1	16	....	....
30 Brocton, village	*1,181*	*1,292*	*29*	....	*19*	*23*	*2*	*2*	*10*	....	....
70 Ripley	2,239	2,482	35	....	31	59	1	2	22	....	....
71 Sheridan	1,888	2,077	34	1	25	15	5	1	15	....	....
72 Sherman	732	783	18	1	16	4	3	....	7	....	....
31 Sherman, village	*836*	*949*	*9*	*1*	*15*	*3*	*1*	....	*13*	....	....
73 Stockton	1,781	1,830	20	....	18	22	2	....	12	1	....
74 Villenova	1,140	1,148	18	1	10	56	1	....	4	....	....
75 Westfield	1,496	1,388	23	2	10	14	1	....	6	....	....
32 Westfield, village	*2,985*	*3,319*	*63*	*4*	*50*	*105*	*7*	....	*31*	*5*	....
07 CHEMUNG COUNTY	54,662	**59,017**	**1,453**	**59**	**1,070**	**887**	**119**	**34**	**530**	**45**	**5**
01 Elmira, city	37,176	**40,093**	**1,112**	**48**	**748**	**420**	**88**	**24**	**327**	**40**	**5**
50 Ashland	337	350	6	....	6	1	1	....	5	....	....
20 Wellsburg, village	*432*	*478*	*9*	....	*14*	*4*	....	....	*12*	....	....
51 Baldwin	476	539	9	....	10	1	1	1	7	....	....
52 Big Flats	1,535	1,495	18	1	18	4	2	....	15	1	....
53 Catlin	870	834	11	....	6	12	2	....	3	....	....
54 Chemung	1,328	1,383	22	1	22	7	2	....	16	....	....
55 Elmira	1,113	1,385	22	....	21	1	2	1	11	....	....
21 Elmira Heights, village (57)	*2,732*	*3,154*	*83*	*1*	*48*	*210*	*9*	*4*	*29*	....	....
56 Erin	889	840	12	....	7	2	1	....	5	....	....
57 Horseheads (21)	1,358	1,516	34	2	50	10	4	1	35	....	....
22 Horseheads, village	*1,778*	*1,949*	*30*	*2*	*35*	*125*	*2*	*1*	*29*	*2*	....
58 Southport	2,034	2,320	50	1	32	17	3	....	20	2	....
59 Van Etten	658	709	11	....	14	16	1	1	8	....	....
23 Van Etten, village	*476*	*407*	*7*	....	*11*	*44*	*1*	....	*8*	....	....
60 Veteran	1,470	1,565	17	3	28	13	....	1	18	....	....
01 Elmira State Reformatory	.....	.....	.....	....	1	.....	....	....	....	....	....
08 CHENANGO COUNTY	35,575	**36,648**	**615**	**28**	**664**	**529**	**56**	**10**	**438**	**27**	**3**
01 Norwich, city	7,422	**8,342**	**160**	**8**	**158**	**81**	**21**	**2**	**83**	**5**	....
50 Afton	1,051	1,055	17	....	16	6	1	1	10	....	....
20 Afton, village	*729*	*754*	*11*	....	*16*	*15*	*1*	....	*12*	....	....
51 Bainbridge	858	803	17	2	14	38	1	....	11	....	....
21 Bainbridge, village	*1,159*	*1,201*	*15*	*1*	*22*	*28*	*2*	*1*	*14*	*4*	....

District numbers, population (U. S. Census, April 15, 1910, *and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution:* **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 10‡	All other causes,		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
....	....	....	....	....	....	....	....	*3*	*2*	....	....	....	....	*2*	*11*	*21*
9	....	....	....	....	....	....	....	....	3	....	1	3	....	3	50	54
2	....	....	....	....	*1*	....	....	*2*	....	....	....	*1*	....	....	*4*	*22*
2	....	....	....	*4*	....	....	....	....	....	....	....	....	....	....	*3*	*34*
....	....	3	....	....	....	....	....	1	1	....	....	....	....	2	5	55
1	....	....	....	....	....	....	....	....	....	....	....	*1*	....	*7*	*8*	*23*
....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	15	56
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	57
9	....	....	....	7	....	1	....	1	1	....	....	....	....	2	24	58
....	....	....	....	....	....	....	....	*1*	....	....	....	....	....	....	*3*	*33*
7	....	2	....	2	1	....	....	....	1	....	1	1	....	....	16	59
....	....	....	....	....	....	....	....	....	....	....	....	....	*1*	....	*6*	*24*
4	*1*	*3*	....	....	....	*1*	....	*2*	*2*	....	....	*1*	....	*67*	*18*	*25*
1	....	....	....	....	....	....	....	1	....	....	....	1	....	3	11	60
1	1	....	....	....	1	....	....	....	....	....	....	....	....	....	4	61
1	....	10	....	....	....	....	....	....	....	....	....	2	....	4	19	62
33	1	....	....	11	....	1	....	1	1	....	....	6	1	20	17	63
5	....	....	....	....	....	....	....	*1*	....	....	....	*1*	....	*18*	*9*	*26*
36	....	....	....	*1*	*1*	*20*	....	*3*	*1*	....	....	*1*	*2*	*7*	*27*	*27*
10	....	....	....	12	....	....	....	1	3	....	....	2	....	79	35	64
3	....	....	....	....	....	....	....	*1*	....	....	....	....	....	*38*	*7*	*28*
1	....	3	....	....	....	1	....	....	....	....	....	....	....	....	9	65
....	....	12	....	....	....	....	....	....	....	....	....	2	....	13	13	66
3	....	2	....	....	....	2	....	2	1	....	....	....	....	1	17	67
3	....	6	....	37	....	2	....	....	....	....	....	1	....	23	25	68
17	....	*21*	....	*116*	*3*	*3*	....	*4*	*5*	....	....	*6*	*1*	*128*	*65*	*29*
3	....	19	....	4	....	1	....	1	....	....	....	1	1	3	31	69
....	....	*1*	*1*	*14*	....	....	....	*2*	....	....	*1*	*1*	*1*	*5*	*15*	*30*
21	....	11	....	1	....	6	1	5	2	....	....	1	1	15	26	70
6	....	2	....	4	....	3	....	....	1	....	....	....	....	....	24	71
....	....	....	....	....	....	....	....	....	1	....	....	1	....	4	14	72
5	....	....	....	....	....	....	....	....	....	....	....	*2*	....	....	*13*	*31*
....	....	....	....	9	....	....	....	1	....	....	....	....	1	11	17	73
18	....	....	....	....	....	....	....	1	2	....	....	....	....	37	8	74
14	....	....	....	....	....	....	....	....	2	....	....	....	1	....	7	75
71	....	*1*	....	*6*	....	....	....	*3*	*5*	....	....	*3*	*3*	*19*	*39*	*32*
245	....	**75**	**3**	**106**	**2**	**93**	**3**	**140**	**44**	**4**	**13**	**77**	**19**	**179**	**904**	**07**
52	....	**31**	**2**	**10**	**1**	**72**	**2**	**130**	**33**	....	**6**	**53**	**16**	**85**	**630**	**01**
....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	6	50
....	....	....	....	*1*	....	*1*	....	....	....	....	....	*1*	....	*2*	*13*	*20*
....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	10	51
1	....	1	....	....	....	....	....	....	....	....	....	1	1	1	16	52
11	....	....	....	....	....	....	....	....	....	....	....	....	....	1	6	53
1	....	3	....	1	....	....	....	....	....	....	....	....	....	2	22	54
....	....	....	....	....	....	....	....	....	....	1	1	1	....	....	19	55
114	....	*6*	*1*	....	....	*17*	*1*	*3*	*5*	*1*	....	*2*	*1*	*69*	*38*	*21*
1	....	....	....	....	....	....	....	....	....	1	1	1	....	....	5	56
1	....	5	....	....	....	1	....	3	3	....	....	4	1	....	42	57
2	....	*29*	....	*85*	....	*2*	....	....	*1*	....	*3*	*3*	....	*14*	*28*	*22*
3	....	3	....	6	....	....	....	2	....	....	....	4	....	1	28	58
12	....	....	....	2	....	....	....	1	1	....	....	3	....	1	10	59
41	....	*1*	....	....	....	....	....	*1*	....	....	....	*1*	....	*1*	*10*	*23*
6	....	3	....	1	1	....	....	....	1	1	2	3	....	2	21	60
....	....	....	....	....	....	....	....	18	....	....	....	....	....	18	....	01
263	**1**	**46**	....	**40**	....	**56**	....	**24**	**24**	**4**	**10**	**53**	**6**	**69**	**567**	**08**
10	....	....	....	**11**	....	**37**	....	**6**	**8**	....	**2**	**9**	**4**	**12**	**135**	**01**
4	....	....	....	....	....	2	....	....	1	....	1	....	....	....	14	50
11	....	*3*	....	....	....	*1*	....	....	*2*	....	....	*1*	....	....	*15*	*29*
13	....	2	....	1	....	4	....	....	....	....	....	1	....	18	15	51
12	....	*4*	....	*5*	....	....	....	*1*	*1*	....	....	*5*	*1*	*2*	*15*	*21*

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death: Under 1	Age at death: 1 to 4	Age at death: 50 years and over	Typhoid fever, 1: Cases	Typhoid fever, 1: Deaths
CHENANGO COUNTY—(*Concluded*)											
52 Columbus	838	794	11	...	13	8	3	....	7	....	...
53 Coventry	764	793	13	...	9	3	2	....	3	1	...
54 German	371	412	7	...	9	.....	1	....	4	....	...
55 Greene	1,717	1,687	42	2	30	64	1	....	24	1	...
22 Greene, village	*1,275*	*1,272*	*15*	*2*	*23*	*10*	.....	....	*22*	*1*	*1*
56 Guilford	2,013	1,963	26	...	22	3	1	....	13	....	...
57 Lincklaen	570	532	10	...	9	6	.....	....	4	....	...
58 McDonough	813	825	15	1	13	1	.....	.....	7	1	...
59 New Berlin	1,214	1,311	10	1	11	25	1	1	8	....	...
23 New Berlin, village	*1,114*	*1,131*	*14*	*1*	*24*	*142*	.....	.....	*20*	....	...
60 North Norwich	691	699	13	...	14	2	2	2	5	1	...
61 Norwich	1,138	1,201	20	2	20	5	3	1	11	1	
62 Otselic	1,104	967	17	2	18	1	4	....	13	....	...
63 Oxford	1,360	1,479	22	2	21	5	.....	.....	13	....	...
25 Orford, village	*1,654*	*1,594*	*20*	*1*	*31*	*37*	*5*	....	*17*	*6*	*1*
64 Pharsalia	657	699	11	...	10	1	.....	.....	6	1	...
65 Pitcher	664	656	7	1	14	4	2	....	11	2	...
66 Plymouth	913	959	13	...	13	2	1	1	8	....	...
67 Preston	649	640	11	1	35	2	1	....	29	1	...
68 Sherburne	1,461	1,539	41	...	19	13	2	1	12	....	...
26 Earlville, village (*pt.*	*262*	*253*)	*3*	...	*5*	*3*	.....	.....	*5*	....	...
[*26* Earlville, village (2656)*	*874*	*845*]	*11*	...	*15*	*64*	.....	.....	*13*	....	...
27 Sherburne, village	*960*	*1,016*	*14*	*1*	*16*	*5*	*1*	....	*11*	*1*	*1*
69 Smithville	949	932	18	...	16	8	.....	.....	12	....	...
70 Smyrna	948	892	19	...	3	8	.....	.....	3	....	...
28 Smyrna, village	*257*	*247*	*3*	...	*7*	*3*	.....	.....	*7*	*1*	...
63 Woman's Relief Corps Home	.....	.....	.....	...	33	.....	.....	.....	33	....	..
09 CLINTON COUNTY	**48,230**	**47,561**	**1,090**	**36**	**682**	**670**	**120**	**31**	**293**	**45**	**9**
01 Plattsburg, city	**11,138**	**10,134**	**262**	**13**	**204**	**148**	**30**	**9**	**76**	**19**	**4**
50 Altona	2,383	2,328	48	...	34	9	14	....	13	1	1
51 Ausable	999	971	16	1	20	2	2	....	11	....	...
20 Keeseville, village (*pt.*	*1,046*	*997*)	*23*	*1*	*15*	*6*	*1*	....	*11*	*5*	*1*
[*20† Keeseville, village (1550)*	*1,835*	*1,795*]	*31*	*1*	*28*	*7*	*2*	....	*2*	*5*	*1*
52 Beekmantown	1,866	1,862	29	1	25	35	3	2	15	....	...
53 Black Brook	1,959	1,962	42	3	20	13	3	1	7	2	...
54 Champlain	1,719	1,517	35	...	18	26	2	2	9	3	1
21 Champlain, village	*1,280*	*1,279*	*21*	...	*24*	*14*	*4*	*1*	*14*	*2*	...
22 Rouses Point, village	*1,638*	*1,783*	*36*	...	*22*	*8*	....	*1*	*8*	*1*	*2*
55 Chazy	2,973	3,187	75	6	46	86	10	6	20	3	...
56 Clinton	1,598	1,386	42	...	14	47	4	2	5	2	...
57 Dannemora	3,153	3,793	59	...	23	19	7	1	5	....	...
23 Dannemora, village (62)	*1,146*	*869*	*28*	*1*	*4*	*4*	*4*	....	*4*	....	...
58 Ellenburgh	3,079	2,965	82	1	20	46	5	2	9	....	...
59 Mooers	2,603	2,653	60	...	32	101	9	....	13	....	...
24 Mooers, village	*560*	*522*	*10*	...	*3*	*11*	....	*2*	....	*2*	...
60 Peru	2,236	2,356	50	...	28	10	3	....	17	....	...
61 Plattsburg	2,362	2,380	54	1	37	23	5	....	23	....	...
62 Saranac (23)	2,904	2,984	87	7	35	24	12	2	16	2	...
63 Schuyler Falls	1,588	1,633	31	1	21	21	2	....	14	....	...
23 Clinton Prison	.....	.....	.....	...	20	.....	.....	.....	2	....	...
23 Dannemora State Hospital	.....	.....	.....	...	17	17	.....	.....	1	....	...
10 COLUMBIA COUNTY	**43,658**	**44,111**	**841**	**27**	**716**	**656**	**71**	**20**	**411**	**32**	**4**
01 Hudson, city	**11,417**	**11,544**	**331**	**8**	**231**	**191**	**37**	**8**	**105**	**16**	**2**
50 Ancram	1,137	1,110	28	...	14	40	1	....	10	....	...
51 Austerlitz	811	889	11	...	13	5	2	....	6	....	...
52 Canaan	1,167	1,057	17	1	17	26	.....	.....	15	....	...
53 Chatham	2,282	2,215	31	...	41	13	....	2	28	....	...
20 Chatham, village (59)	*2,251*	*2,388*	*38*	*1*	*38*	*52*	*4*	*1*	*21*	....	...
54 Claverack	2,301	2,343	16	...	33	29	1	....	22	3	1
21 Philmont, village	*1,813*	*2,060*	*26*	*1*	*27*	*17*	.....	.....	*16*	*1*	...

* Earlville, village, located in counties Chenango and Madison.
† Village of Keeseville located in two counties, Clinton and

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
5	....	....	....	2	....	....	....	....	....	....	....	1	....	1	12	52
1	....	1	....	....	....	....	....	....	1	....	....	....	....	....	8	53
....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	8	54
32	....	18	....	13	....	....	....	....	1	....	....	2	....	....	26	55
2	....	*6*	....	*1*	....	....	....	....	*1*	....	....	*5*	....	....	*16*	*22*
1	....	....	....	....	....	....	....	2	....	....	....	4	....	....	18	56
....	....	....	....	....	....	....	....	....	....	....	....	1	....	6	8	57
....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	12	58
19	....	1	....	2	....	....	....	....	....	....	1	1	....	3	9	59
131	*1*	....	....	....	....	....	....	*1*	....	....	*1*	*1*	....	*10*	*22*	*23*
....	....	....	....	....	....	1	....	....	1	....	1	1	....	....	11	60
....	....	....	....	....	....	....	....	1	2	3	....	....	....	....	18	61
....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	17	62
1	....	....	....	....	....	....	....	2	1	....	1	2	....	2	17	63
11	....	*2*	....	....	....	*6*	....	*3*	*1*	....	*2*	*1*	*1*	*9*	*25*	*25*
....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	8	64
2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14	65
....	....	....	....	....	....	1	....	1	1	....	....	2	....	....	10	66
....	....	....	....	....	....	....	....	1	....	....	....	3	....	....	32	67
5	....	1	....	....	....	1	....	1	1	1	1	2	....	4	15	68
....	....	....	....	....	....	....	....	*1*	....	....	....	....	....	*2*	*5*	*26*]
3	....	....	....	*41*	....	....	....	*1*	....	....	....	*2*	....	*19*	*13*	*26*
....	....	....	....	....	....	*1*	....	*3*	....	....	....	*2*	....	....	*13*	*27*
2	....	4	....	....	....	2	....	....	....	....	....	2	....	....	14	69
....	....	3	....	5	....	....	....	....	....	....	....	1	....	....	2	70
1	....	*1*	....	....	....	....	....	....	....	....	....	*1*	....	....	*6*	*28*
....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	31	63
168	**1**	**93**	**1**	**127**	**9**	**71**	**12**	**55**	**65**	**1**	**5**	**31**	**16**	**110**	**533**	**09**
1	....	**42**	**1**	**13**	**2**	**26**	**1**	**13**	**12**	....	**2**	**11**	**4**	**34**	**167**	**01**
....	....	1	....	4	....	....	....	1	1	....	....	4	3	2	25	50
....	....	....	....	....	....	....	....	1	2	....	....	1	....	1	17	51
....	....	....	....	....	*1*	....	....	*1*	*1*	....	....	....	....	....	*12*	*20*
....	....	....	....	....	*1*	....	....	*2*	*2*	....	*1*	*2*	....	....	*21*	*20*]
15	1	....	....	18	1	1	1	....	....	....	1	....	....	1	21	52
1	....	....	....	1	....	5	....	4	1	....	....	2	....	....	17	53
2	....	....	....	11	....	6	....	....	1	....	1	2	....	4	13	54
7	....	....	....	....	....	*1*	....	*2*	*1*	....	....	*1*	....	*2*	*22*	*21*
3	....	*1*	....	....	....	....	*1*	....	*1*	....	*1*	....	....	....	*17*	*22*
6	....	2	....	34	3	13	4	2	2	....	....	1	1	26	35	55
35	....	....	....	....	1	1	....	4	2	....	....	....	....	5	11	56
12	....	4	....	....	....	2	1	....	3	....	....	....	1	1	18	57
1	....	....	....	*3*	....	....	....	....	....	....	....	*1*	....	....	*3*	*23*
30	....	5	....	....	....	4	1	....	....	1	....	1	2	6	16	58
52	....	22	....	7	....	1	....	4	5	....	....	1	....	15	26	59
....	....	*4*	....	....	....	*3*	*2*	....	....	....	....	....	....	*2*	*1*	*24*
2	....	2	....	....	....	6	....	....	1	....	....	....	....	....	27	60
....	....	2	....	17	....	1	1	1	3	....	....	3	1	2	29	61
....	....	6	....	4	1	1	....	5	2	....	....	1	4	6	27	62
1	....	2	....	15	....	....	....	....	1	....	....	2	....	3	18	63
....	....	....	....	....	....	....	....	....	16	....	....	....	....	....	4	23
....	....	....	....	....	....	....	....	17	10	....	....	....	....	....	7	23
149	**1**	**67**	**1**	**125**	**3**	**21**	**1**	**95**	**46**	**6**	**4**	**63**	**15**	**161**	**578**	**10**
81	....	**2**	....	**8**	....	**14**	....	**33**	**11**	**3**	**2**	**14**	**8**	**34**	**194**	**01**
1	....	1	....	3	....	1	....	5	1	1	1	1	....	28	11	50
1	....	....	....	....	....	1	....	3	....	....	....	1	....	....	12	51
....	....	1	....	21	....	....	....	1	....	....	....	3	....	3	14	52
1	....	5	....	2	....	....	....	2	5	1	....	2	1	2	33	53
1	....	*21*	....	*18*	*1*	....	....	*6*	*4*	*1*	....	....	....	*5*	*33*	*20*
5	....	3	....	11	....	....	....	5	2	....	....	5	....	2	25	54
1	....	....	....	*2*	....	....	....	*5*	*2*	....	....	*5*	....	*3*	*20*	*21*

Total for entire village given in bracketed line.
Essex. Total for entire village given in bracketed line.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (stillbirths excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
COLUMBIA COUNTY—*(Concluded)*											
55 Clermont	800	881	11	...	6	5	1	....	4	1	...
56 Copake	1,283	1,368	31	...	17	13	....	1	12	3	...
57 Gallatin	720	780	15	1	6	21	2	....	3	....	...
58 Germantown	1,649	1,745	31	1	17	29	....	1	9	1	...
59 Ghent (20)	1,682	1,815	17	3	54	5	4	2	44	....	...
60 Greenport	1,639	1,470	29	2	19	11	3	2	2	2	...
61 Hillsdale	1,504	1,313	15	1	17	26	2	....	13	....	...
62 Kinderhook	1,030	1,109	22	1	14	7	1	....	9	....	...
22 Kinderhook, village	*698*	*827*	*16*	...	*18*	*5*	....	*1*	*13*	....	...
23 Valatie, village	*1,219*	*1,410*	*30*	*1*	*19*	*45*	*2*	*1*	*9*	*1*	...
63 Livingston	1,620	1,522	18	1	23	42	1	....	15	....	...
64 New Lebanon	1,378	1,369	16	1	27	20	1	....	20	....	...
65 Stockport	2,506	2,313	41	4	25	9	....	....	15	1	...
66 Stuyvesant	1,980	1,841	38	...	29	27	8	1	13	3	1
67 Taghkanic	771	741	13	...	11	18	1	....	7	....	...
01 State Training School for Girls, Hudson	.....	.....	.....	...	1	1	....	....	....	....	...
11 CORTLAND COUNTY	**29,249**	**30,074**	**575**	**29**	**570**	**1,261**	**57**	**11**	**325**	**16**	**2**
01 Cortland, city	**11,504**	**12,367**	**293**	**15**	**273**	**821**	**32**	**6**	**126**	**10**	**1**
50 Cincinnatus	965	958	17	...	20	10	2	....	15	....	...
51 Cortlandville	2,165	2,379	34	1	47	75	3	1	33	....	...
20 Homer, village (55)	*2,695*	*2,871*	*46*	*4*	*61*	*65*	*2*	....	*43*	....	*1*
21 McGrawville, village	*931*	*887*	*8*	*1*	*18*	*87*	*1*	*1*	*11*	*1*	...
52 Cuyler	881	945	11	...	14	2	2	1	9	....	...
53 Freetown	551	511	9	...	5	6	1	....	3	1	...
54 Harford	623	728	6	...	10	23	1	....	9	....	...
55 Homer (20)	1,255	874	26	1	16	19	4	1	7	1	...
56 Lapeer	475	465	10	...	4	13	1	....	3	....	...
57 Marathon	510	494	8	...	6	13	2	....	3	....	...
22 Marathon, village	*1,079*	*1,006*	*15*	*1*	*16*	*14*	....	....	*13*	*1*	...
58 Preble	757	761	9	2	11	12	....	....	9	....	...
59 Scott	718	683	16	2	17	71	2	1	7	....	...
60 Solon	518	545	4	...	4	17	....	....	3	....	...
61 Taylor	711	703	18	...	5	1	....	....	5	....	...
62 Truxton	1,132	1,089	19	...	15	4	2	....	7	....	...
63 Virgil	1,136	1,201	14	1	19	5	1	....	13	1	...
64 Willett	643	607	12	1	9	3	1	....	6	1	...
12 DELAWARE COUNTY	**45,575**	**45,995**	**912**	**22**	**694**	**810**	**73**	**27**	**404**	**16**	**6**
50 Andes	1,593	1,679	37	...	28	15	4	2	13	....	...
20 Andes, village	*414*	*405*	*3*	...	*9*	*2*	....	....	*9*	....	...
51 Bovina	912	867	11	...	19	3	2	....	14	....	...
52 Colchester	3,193	3,250	87	3	46	31	7	3	19	7	2
53 Davenport	1,427	1,393	21	...	21	11	3	1	11	....	...
54 Delhi	1,079	1,109	21	...	21	7	....	1	15	....	...
21 Delhi, village	*1,736*	*1,743*	*22*	...	*30*	*4*	*2*	*2*	*17*	....	...
55 Deposit	921	892	16	...	7	75	1	....	3	1	...
*22*Deposit, village (0361)*	*720*	*753*	*15*	*3*	*21*	*98*	*2*	*1*	*11*	....	...
56 Franklin	1,930	1,781	41	6	28	10	2	....	20	1	...
23 Franklin, village	*473*	*441*	*4*	...	*12*	*2*	....	....	*8*	....	...
57 Hamden	1,373	1,387	22	...	12	14	....	1	9	....	...
58 Hancock	3,862	3,552	100	1	42	25	9	4	20	....	...
24 Hancock, village	*1,329*	*1,356*	*21*	*1*	*21*	*42*	....	*1*	*15*	....	...
59 Harpersfield	955	936	18	...	14	17	....	....	11	....	...
25 Stamford, village (66)	*973*	*1,060*	*19*	...	*26*	*14*	*2*	*1*	*16*	*1*	*1*
60 Kortright	1,481	1,608	32	...	19	13	2	1	7	....	...
61 Masonville	1,053	988	18	...	20	50	2	1	12	....	...
62 Meredith	1,393	1,472	34	1	17	3	4	1	7	....	...
63 Middletown	3,133	2,611	48	...	41	112	7	....	21	....	...
30 Fleischmanns, village	.....	*767*	*10*	...	*6*	*6*	....	....	*3*	....	...
26 Margaretville, village	*669*	*648*	*13*	*1*	*16*	*18*	....	....	*13*	....	...
64 Roxbury	2,164	2,318	55	...	36	27	4	1	23	....	1

* See Deposit, Broome county.

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
....	....	....	....	....	....	....	....	1	1	.....	....	1	.....	3	4	55
3	....	5	....	....	....	....	....	2	.....	.....	....	3	.....	.....	14	56
....	....	....	....	7	1	....	....	6	.....	.....	....	2	.....	8	3	57
13	....	....	....	....	....	....	....	5	4	.....	....	2	.....	10	11	58
1	....	....	....	....	....	1	1	2	1	.....	1	2	1	1	48	59
5	....	....	....	1	....	....	....	2	1	.....	....	1	1	1	16	60
12	1	3	....	5	1	1	....	1	.....	.....	....	1	.....	4	14	61
....	....	....	....	4	....	....	....	.....	1	.....	....	2	.....	3	11	62
1	....	*2*	....	....	....	....	....	*2*	*1*	.....	....	*3*	.....	.....	*14*	*22*
1	....	....	....	....	....	....	....	*4*	*3*	.....	....	....	*1*	*39*	*15*	*23*
18	....	1	....	19	....	1	....	2	2	.....	....	2	.....	1	19	63
1	....	1	....	8	....	1	....	2	2	.....	....	7	.....	7	18	64
....	....	2	1	....	....	1	....	3	.....	.....	....	2	.....	2	22	65
3	....	20	....	1	....	....	....	.....	1	.....	....	3	3	.....	21	66
....	....	....	....	15	....	....	....	3	4	.....	....	1	.....	.....	6	67
....	....	....	....	....	....	....	....	.....	.....	1	....	....	....	.....	....	01
1013	**1**	**38**	**4**	**9**	....	**5**	**1**	**37**	**19**	**8**	**12**	**37**	**10**	**135**	**484**	**11**
664	....	**12**	**1**	**3**	....	**1**	....	**24**	**9**	**6**	**7**	**17**	**7**	**101**	**231**	**01**
7	....	....	....	1	....	....	....	.....	2	.....	....	2	.....	2	16	50
62	....	2	1	2	....	1	1	.....	1	.....	1	4	1	8	38	51
45	....	*2*	....	*1*	....	*2*	....	*1*	*1*	.....	*2*	*5*	.....	*16*	*52*	*20*
81	....	*1*	....	....	....	....	....	*1*	*2*	*1*	....	*1*	.....	*2*	*15*	*21*
....	....	....	....	....	....	....	....	1	.....	1	....	....	....	.....	14	52
1	1	4	....	....	....	....	....	.....	1	.....	....	....	....	.....	3	53
21	....	....	....	....	....	....	....	.....	.....	.....	....	....	....	2	10	54
15	....	2	1	....	....	....	....	1	.....	.....	....	....	1	.....	14	55
10	....	....	....	....	....	....	....	1	.....	.....	....	....	....	2	4	56
12	....	....	....	1	....	....	....	.....	.....	.....	....	1	.....	.....	5	57
7	....	....	....	*1*	....	....	....	*5*	*1*	.....	....	*2*	.....	.....	*13*	*22*
11	....	....	....	....	....	1	....	.....	.....	.....	....	....	....	.....	11	58
58	....	13	1	....	....	....	....	.....	1	.....	1	....	1	.....	13	59
17	....	....	....	....	....	....	....	.....	.....	.....	....	....	....	.....	4	60
....	....	1	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	4	61
1	....	1	....	....	....	....	....	1	1	.....	....	2	.....	1	12	62
1	....	....	....	....	....	....	....	2	.....	.....	....	2	.....	1	17	63
2	....	....	....	....	....	....	....	.....	.....	.....	1	....	....	.....	8	64
439	**1**	**30**	....	**105**	**5**	**24**	**1**	**40**	**28**	**3**	**6**	**40**	**7**	**153**	**600**	**12**
4	....	1	....	3	....	1	....	4	2	.....	....	2	.....	2	24	50
2	....	....	....	....	....	....	....	.....	.....	.....	....	*1*	.....	.....	*8*	*20*
....	....	....	....	....	....	....	....	1	.....	.....	1	2	1	2	15	51
4	....	2	....	....	....	....	....	4	1	.....	....	5	.....	14	38	52
10	....	....	....	....	....	1	....	.....	1	.....	1	1	.....	.....	18	53
4	....	....	....	....	....	....	....	3	2	.....	....	....	....	.....	19	54
3	....	....	....	....	....	....	....	.....	*2*	.....	*3*	....	*1*	*1*	*24*	*21*
64	....	1	....	....	....	....	....	1	1	.....	....	....	.....	8	6	55
71	*1*	....	....	....	....	....	....	*1*	*1*	.....	....	....	.....	*26*	*19*	*22*
....	....	....	....	....	....	....	....	1	1	.....	....	....	.....	8	27	56
....	....	....	....	....	....	....	....	.....	.....	*1*	....	....	.....	*1*	*12*	*23*
3	....	4	....	3	....	....	....	3	2	1	....	....	....	.....	10	57
7	....	6	....	....	1	5	1	5	2	.....	....	3	.....	2	35	58
28	....	*1*	....	7	....	....	....	.....	.....	.....	....	....	.....	*6*	*21*	*24*
14	....	....	....	2	....	....	....	.....	1	.....	....	2	.....	1	11	59
4	....	....	....	*6*	....	....	....	*3*	*1*	.....	....	....	.....	.....	*23*	*25*
11	....	....	....	....	....	....	....	.....	1	.....	....	....	1	2	17	60
40	....	....	....	10	....	....	....	.....	.....	.....	....	2	.....	.....	18	61
2	....	....	....	1	....	....	....	.....	1	.....	....	....	.....	.....	16	62
75	....	....	....	34	1	1	....	1	1	.....	....	4	1	1	34	63
1	....	....	....	....	....	....	....	*1*	*1*	.....	....	....	.....	*4*	*5*	*30*
15	....	....	....	*2*	....	....	....	.....	*1*	.....	....	*2*	.....	*1*	*13*	*26*
13	....	6	....	3	....	1	....	1	2	.....	....	2	1	3	30	64

for complete total.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
DELAWARE COUNTY—*(Concluded)*											
65 Sidney	1,641	1,574	27	...	28	7	1	....	22	1	...
27 Sidney, village	*2,507*	*2,641*	*47*	...	*41*	*33*	*7*	*3*	*23*	*1*	*1*
66 Stamford (25)	885	974	18	1	11	18	2	....	5	2	1
28 Hobart, village	*544*	*596*	*10*	...	*5*	.....	*1*	....	*2*	.....	...
67 Tompkins	2,127	1,919	42	3	23	58	....	....	15	.....	...
68 Walton	1,985	1,669	47	1	17	39	3	2	7	1	...
29 Walton, village	*3,103*	*3,606*	*53*	*1*	*58*	*66*	*5*	*1*	*34*	*1*	...
13 DUTCHESS COUNTY	87,661	**91,044**	**1,925**	**53**	1,821	**1,961**	**202**	**63**	**855**	**58**	**5**
01 Beacon, city	10,629	**10,165**	**212**	**12**	**223**	**290**	**22**	**8**	**93**	**2**	...
02 Poughkeepsie, city	27,936	**32,714**	**847**	**13**	**545**	**763**	**92**	**31**	**236**	**15**	**3**
50 Amenia	2,123	2,204	21	...	17	19	1	1	12	.....	...
51 Beekman	827	951	9	...	19	8	3	2	8	.....	...
52 Clinton	1,278	1,333	19	...	16	6	....	....	11	.....	...
53 Dover	2,016	1,967	43	...	25	35	5	3	10	....	...
54 East Fishkill	2,226	2,173	41	...	37	26	7	....	24	4	...
55 Fishkill	2,713	2,683	52	1	25	54	6	....	8	1	...
20 Fishkill, village	*516*	*531*	*2*	...	*9*	*19*	*1*	....	*4*	.....	...
56 Hyde Park	3,019	3,144	33	2	32	50	5	....	15	1	...
57 LaGrange	1,350	1,326	14	2	25	11	....	....	17	1	...
58 Milan	893	824	12	...	9	3	....	....	6	.....	...
59 Northeast	1,252	1,452	22	...	17	6	2	1	9	.....	...
21 Millerton, village	*858*	*890*	*10*	...	*8*	*6*	*1*	*2*	*2*	.....	...
60 Pawling	1,079	1,153	21	...	12	10	2	....	9	.....	...
22 Pawling, village	*848*	*1,050*	*14*	...	*13*	*14*	....	....	*7*	.....	...
61 Pine Plains	1,420	1,387	34	...	21	31	4	....	13	1	...
62 Pleasant Valley	931	903	13	...	3	3	1	....	2	.....	...
23 Pleasant Valley, village	*427*	*429*	*3*	*1*	*9*	*2*	*1*	....	*8*	.....	...
63 Poughkeepsie	7,702	4,937	174	8	468	50	16	8	180	1	...
24 Wappingers Falls, village (68)	*3,195*	*3,742*	*90*	*8*	*58*	*38*	*7*	*4*	*29*	*2*	...
64 Red Hook	1,711	1,805	20	...	18	22	1	....	10	1	1
25 Red Hook, village	*960*	*923*	*14*	*1*	*27*	*4*	*2*	....	*20*	.....	...
26 Tivoli, village	*1,034*	*1,080*	*18*	...	*10*	*24*	*1*	....	*6*	.....	...
65 Rhinebeck	1,984	1,905	23	1	26	32	2	....	18	1	...
27 Rhinebeck, village	*1,548*	*1,580*	*23*	*2*	*33*	*95*	*3*	....	*24*	.....	...
66 Stanford	1,520	1,582	27	...	12	60	2	....	9	1	...
67 Union Vale	1,097	1,149	14	1	11	56	2	....	8	2	1
68 Wappinger (24)	1,542	1,524	28	...	25	10	6	1	10	2	...
69 Washington	1,891	2,286	33	...	53	40	4	1	38	7	...
28 Millbrook, village	*1,136*	*1,252*	*39*	*1*	*15*	*69*	*3*	*1*	*9*	*16*	...
01 Matteawan State Hospital	.....	.....	.....	...	45	9	1	....	15	.....	...
02 Hudson River State Hospital	.....	.....	.....	...	315	105	....	....	....	.....	...
14 ERIE COUNTY	528,985	**571,897**	**16,509**	**595**	**9,449**	**10547**	**1860**	**555**	**2693**	**315**	**56**
01 Buffalo, city	423,715	**454,630**	**13,468**	**501**	**7,664**	**8,345**	**1403**	**417**	**2092**	**216**	**47**
02 Lackawanna, city	14,549	**15,737**	**926**	**24**	**448**	**696**	**260**	**88**	**10**	**15**	...
03 Tonawanda, city	8,290	**9,147**	**205**	**7**	**119**	**137**	**17**	**8**	**47**	**21**	...
50 Alden	1,920	2,089	31	1	23	11	1	2	10	.....	...
20 Alden, village	*828*	*777*	*11*	...	*10*	*1*	*1*	....	*7*	.....	...
51 Amherst	3,524	4,117	70	3	53	45	4	2	32	1	...
21 Williamsville, village	*1,105*	*1,272*	*19*	*1*	*15*	*47*	....	....	*8*	.....	...
52 Aurora	1,698	2,001	27	2	17	24	2	1	8	.....	...
22 East Aurora, village	*2,781*	*3,445*	*42*	*1*	*44*	*88*	*3*	....	*28*	*1*	...
53 Boston	1,535	1,489	20	...	13	4	2	....	6	.....	...
54 Brant	1,884	2,218	35	1	26	40	5	3	8	.....	...
23 Farnham, village	*540*	*636*	*14*	...	*3*	*7*	*1*	....	*1*	.....	...
55 Cheektowaga	5,641	6,441	224	12	92	181	22	8	22	5	...
24 Depew, village (67)	*3,921*	*4,932*	*253*	*4*	*62*	*24*	*31*	*5*	*4*	.....	...
25 Sloan, village	*1,259*	*2,202*	*49*	*3*	*16*	*7*	*6*	*3*	*4*	.....	...
56 Clarence	2,991	3,082	38	3	35	17	3	1	17	3	1
57 Colden	1,303	1,390	13	2	11	3	....	....	10	.....	...
58 Collins	3,905	1,929	48	2	37	7	4	....	20	1	...

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 101	All other causes,		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
2	....	1	....	....	....	....	....	1	2	1	....	....	.....	1	26	65
3	....	*2*	....	*11*	2	*5*	....	*1*	.....	.....	....	*2*	*1*	.....	*35*	*27*
1	....	....	....	7	....	5	....	1	.....	.....	....	2	.....	2	8	66
....	....	....	....	....	....	....	....	....	....	.....	....	....	.....	.....	*6*	*28*
47	....	1	....	5	....	....	....	2	.....	.....	....	3	.....	3	20	67
5	....	....	....	9	1	....	....	2	1	.....	....	2	.....	22	13	68
6	....	*5*	....	*2*	....	*5*	....	*4*	*1*	.....	*1*	*5*	*1*	*43*	*50*	*29*
245	**1**	**124**	**3**	**308**	**13**	**115**	**10**	**295**	**169**	**13**	**15**	**83**	**34**	**803**	**1488**	**13**
166	**1**	....	....	**29**	**5**	**29**	....	**35**	**19**	**5**	**3**	**16**	**3**	**24**	**176**	**01**
22	....	**45**	....	**45**	**4**	**31**	**3**	**126**	**29**	**2**	**5**	**28**	**17**	**477**	**456**	**02**
....	....	5	1	11	....	....	....	2	.....	1	....	....	.....	.....	16	50
....	....	1	....	....	....	6	1	.....	.....	.....	....	2	.....	1	16	51
....	....	....	....	....	....	1	....	4	.....	.....	....	....	.....	1	16	52
1	....	3	....	27	2	....	....	.....	.....	.....	....	.....	.....	4	23	53
1	....	4	....	....	....	....	....	3	3	.....	....	2	2	14	30	54
9	....	....	....	....	....	6	....	8	1	.....	....	3	.....	30	21	55
....	....	....	....	*1*	....	....	....	*2*	*1*	.....	*1*	....	.....	*16*	*7*	*20*
1	....	32	....	1	....	4	....	1	2	.....	....	3	.....	10	27	56
1	....	1	....	....	....	....	....	6	4	.....	....	....	.....	2	21	57
....	....	1	....	1	....	1	....	.....	.....	.....	....	....	.....	.....	9	58
....	....	2	....	....	....	3	1	1	1	.....	....	1	1	.....	13	59
2	....	....	....	....	....	*1*	....	*1*	.....	.....	....	....	*1*	*2*	*7*	*21*
....	....	1	....	5	....	....	....	2	.....	.....	....	1	1	2	10	60
....	....	....	....	*1*	....	*3*	....	*2*	*1*	.....	....	*1*	*1*	*8*	*10*	*22*
1	....	....	....	18	....	5	....	1	1	.....	....	1	.....	5	19	61
....	....	....	....	....	....	3	....	.....	.....	.....	....	....	.....	.....	3	62
....	....	....	....	....	....	*1*	....	*1*	.....	.....	....	....	.....	.....	*9*	*23*
3	....	5	....	1	....	3	4	13	35	.....	4	8	3	24	350	63
4	....	*14*	*2*	....	....	*2*	....	*6*	*3*	*1*	*1*	*3*	*2*	*9*	*47*	*24*
....	....	1	....	7	....	....	....	.....	1	1	....	2	.....	12	14	64
....	....	....	....	....	....	*2*	....	*2*	*1*	.....	*1*	....	.....	.....	25	*25*
....	....	....	....	....	....	*3*	....	.....	.....	.....	....	....	.....	*21*	*10*	*26*
11	....	1	....	2	....	....	....	3	2	1	....	1	.....	13	23	65
14	....	....	....	....	....	....	....	1	1	.....	....	....	.....	*80*	*32*	*27*
4	....	....	....	46	....	....	....	1	.....	.....	....	1	1	8	10	66
....	....	....	....	48	....	5	1	.....	.....	.....	....	2	.....	1	7	67
4	....	2	....	....	....	1	....	1	1	.....	....	1	1	.....	22	68
1	....	5	....	22	1	1	....	.....	2	.....	....	4	.....	4	46	69
....	....	*1*	....	*43*	*1*	....	....	*2*	.....	.....	....	....	*1*	*7*	*13*	*28*
....	....	....	....	....	....	....	....	9	4	.....	....	3	.....	.....	38	01
....	....	....	....	....	....	4	3	71	61	2	3	3	.....	28	245	02
1169	**61**	**770**	**32**	**2304**	**84**	**1300**	**126**	**1,820**	**815**	**135**	**99**	**558**	**605**	**2,734**	**7013**	**14**
870	**7**	**629**	**30**	**1822**	**56**	**1053**	**108**	**1,640**	**723**	**109**	**79**	**463**	**474**	**2,006**	**5677**	**01**
190	**53**	**17**	....	**190**	**21**	**68**	**3**	**60**	**21**	**8**	**5**	**1**	**80**	**148**	**264**	**02**
3	....	**10**	....	**36**	....	**14**	**1**	**11**	**6**	**2**	....	**16**	**6**	**40**	**90**	**03**
1	....	1	....	2	....	3	....	1	2	2	2	1	.....	1	18	50
....	....	*1*	....	....	....	....	....	.....	.....	.....	....	*2*	.....	.....	*8*	*20*
19	....	1	....	5	....	1	....	1	1	.....	....	6	.....	17	46	51
1	....	*2*	....	*1*	....	*2*	....	*1*	*1*	.....	....	*2*	.....	*40*	*12*	*21*
....	....	1	....	9	....	3	1	.....	1	.....	....	1	1	10	13	52
6	....	*4*	....	*25*	....	*4*	....	*2*	*2*	*1*	*1*	*8*	.....	*45*	*33*	*22*
2	....	....	....	....	....	....	....	1	1	1	....	....	.....	.....	12	53
....	....	6	....	6	1	3	....	3	2	.....	2	1	1	22	19	54
....	....	*5*	....	....	....	....	....	.....	.....	.....	....	....	.....	*2*	*3*	*23*
15	....	20	....	49	2	31	2	19	8	2	2	3	7	40	68	55
1	....	*4*	....	....	....	*8*	....	*7*	*2*	*1*	*1*	*2*	*16*	*3*	*41*	*24*
....	....	*2*	....	....	*1*	*4*	*1*	*1*	.....	.....	....	*1*	*3*	.....	*10*	*25*
....	....	1	....	....	....	....	....	2	2	.....	1	3	.....	11	28	56
....	....	....	....	3	....	....	....	.....	.....	.....	....	....	.....	.....	11	57
1	....	....	....	2	....	1	....	1	2	.....	....	3	.....	1	32	58

Table 17.—STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
ERIE COUNTY—(*Concluded*)											
26 **Gowanda, village (0476)*	(*pt. 663*	*724*)	*5*	...	*7*	*8*	....	....	3	....	....
59 Concord	2,145	1,882	43	2	29	12	3	....	19	2	...
27 Springville, village	*2,246*	*2,668*	*28*	*1*	*35*	*26*	*2*	....	*20*	*2*	*1*
60 East Hamburg	2,636	3,004	44	1	27	66	4	2	10	1	...
61 Eden	2,526	2,616	46	...	24	18	4	....	16	2	...
62 Elma	2,130	2,282	40	1	19	42	2	....	12	1	...
63 Evans	2,226	2,450	50	2	31	5	6	1	13	....	....
28 Angola, village	*898*	*1,194*	*44*	...	*13*	*8*	*1*	....	*8*	....	....
64 Grand Island	914	964	16	...	5	4	....	....	3	2	...
65 Hamburg	3,075	3,690	64	4	55	41	14	3	18	1	...
29 Blasdell, village	*849*	*940*	*35*	...	*9*	*9*	*1*	*1*	*2*	*2*	...
30 Hamburg, village	*2,134*	*2,744*	*53*	...	*37*	*77*	*6*	*2*	*18*	*2*	...
66 Holland	1,468	1,584	24	...	15	24	2	....	9	....	....
67 Lancaster (24)	2,128	2,466	34	...	21	36	4	....	10	....	....
31 Lancaster, village	*4,364*	*5,094*	*136*	*2*	*56*	*123*	*14*	*3*	*20*	*4*	...
68 Marilla	1,382	1,409	21	...	11	12	2	....	7	....	....
69 Newstead	2,083	2,167	45	3	21	7	4	....	10	1	...
32 Akron, village	*1,677*	*1,856*	*24*	...	*31*	*27*	*2*	....	*21*	....	....
70 North Collins	2,424	1,637	23	2	8	6	1	....	6	....	....
34 North Collins, village	.....	*1,068*	*22*	*1*	*15*	*9*	....	....	*10*	....	....
71 Sardinia	1,644	1,661	24	1	29	14	2	1	21	....	....
72 Tonawanda	1,155	1,362	26	3	29	11	6	2	1	2	...
33 Kenmore, village	*1,020*	*1,700*	*29*	*2*	*18*	*12*	*1*	....	*12*	....	....
73 Wales	1,203	1,197	26	...	9	15	2	....	3	....	....
74 West Seneca	4,605	5,926	114	3	93	191	12	2	47	2	...
Indian Reservation	*.....	58	.....	...	.....	.....	.....	.....	.....	.....	.....
01 Buffalo State Hospital	.....	.....	.....	...	202	21	1	....	93	3	...
58 Gowanda State Hospital	.....	.....	.....	...	114	60	....	....	40	28	7
15 ESSEX COUNTY	**33,458**	**32,461**	**758**	**29**	**595**	**686**	**87**	**22**	**229**	**41**	**3**
50 Chesterfield	1,040	1,067	20	...	16	2	....	1	11	1	...
20 †*Keeseville, village (0951)*	(*pt. 789*	*798*)	*8*	...	*13*	*1*	*1*	....	*9*	....	....
51 Crown Point	1,690	1,605	24	...	22	9	....	1	11	....	....
52 Elizabethtown	603	675	6	...	7	10	....	....	4	....	....
21 Elizabethtown, village	*505*	*530*	7	...	*12*	*9*	....	....	*8*	....	....
53 Essex	1,276	1,193	24	1	32	.....	4	1	18	....	....
54 Jay	2,231	2,382	66	4	36	24	6	2	15	1	...
55 Keene	1,227	1,138	21	...	17	18	4	....	8	....	....
56 Lewis	937	844	17	...	10	31	....	....	6	....	....
57 Minerva	848	705	7	...	8	1	....	1	2	....	....
58 Moriah	4,488	3,423	178	3	97	40	34	7	22	2	...
22 Port Henry, village	*2,266*	*2,584*	*59*	*3*	*45*	*8*	*11*	*2*	*17*	*1*	...
59 Newcomb	509	511	3	...	1	2	....	....	....	....	....
60 North Elba	1,195	1,053	15	1	10	28	2	....	6	2	...
23 Lake Placid, village	*1,682*	*1,977*	*59*	*4*	*32*	*195*	*7*	....	*9*	*1*	...
24 Saranac Lake, village	(*pt. 1,019*	*843*)	*18*	*3*	*64*	*43*	*4*	*1*	*7*	....	....
[*24* ‡*Saranac Lake, village (62,1663)*	4,983	*4,918*]	*94*	*5*	*241*	*1,476*	*8*	*2*	*27*	*1*	...
61 North Hudson	434	477	6	...	3	3	1	1	....	2	1
62 St. Armand	297	558	1	...	4	23	....	....	....	17	...
25 Bloomingdale, village	*382*	*394*	*4*	...	*8*	*5*	*1*	....	*3*	*2*	...
(*26*) *Saranac Lake, village (60,1663)*	(*pt. 67*	*60*)	.....	...	.....	.....	.....	.....	.....	.....	.....
63 Schroon	1,013	967	15	1	17	2	1	....	10	....	....
64 Ticonderoga	2,465	1,992	85	4	57	48	6	2	20	3	...
27 Ticonderoga, village	*2,475*	*2,754*	*25*	*2*	*27*	*24*	....	....	*15*	*1*	...
65 Westport	1,175	970	20	1	19	14	3	1	10	....	....
28 Westport, village	*692*	*716*	11	1	8	22	1	....	5	....	....
66 Willsboro	1,580	1,652	40	1	15	26	1	1	10	....	....
67 Willmington	573	593	19	...	5	90	....	1	3	1	1
60 Raybrook Hospital for Incipient Tuberculosis	.....	.....	.....	...	10	8	....	....	....	7	1

* See Gowanda, Cattaraugus county, for complete total. † See Keeseville, Clinton county. Total for entire village given in bracketed line.

District numbers, population (U. S. Census, April 15, 1910, *and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution:* **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
1	....	*1*	....	*4*	....	.....	.....	.....	*1*	.....	.....	.....	.....	*2*	6	*26*
2	....	1	....	1	....	.....	.....	.....	1	.....	.....	5	1	6	22	59
.....	.....	2	....	2	....	4	1	3	1	2	....	5	.....	*11*	*27*	*27*
1	....	4	....	10	....	8	1	6	1	.....	1	3	3	36	18	60
.....	.....	2	....	7	....	1	....	1	.....	.....	.....	2	1	5	21	61
1	....	.....	....	17	....	.....	.....	1	.....	.....	.....	4	1	22	14	62
.....	.....	1	....	.....	....	2	....	2	3	.....	.....	1	.....	.....	27	63
4	....	*2*	....	.....	....	.....	.....	*1*	.....	*1*	....	.....	.....	.....	*13*	*28*
.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	1	.....	.....	2	64
3	....	4	....	7	....	7	1	3	2	1	1	1	.....	15	50	65
.....	.....	1	....	.....	....	*2*	....	*1*	*1*	.....	.....	.....	*1*	*3*	*7*	*29*
4	....	*11*	....	.....	....	*22*	*1*	*4*	*4*	*3*	*2*	*2*	.....	*31*	*28*	*30*
.....	.....	3	....	.....	....	.....	.....	.....	.....	.....	.....	1	.....	21	14	66
3	....	1	....	16	....	1	....	8	4	.....	.....	1	.....	7	16	67
8	....	*9*	....	*22*	....	*8*	*1*	*6*	*1*	*2*	....	*4*	*4*	*64*	*46*	*31*
.....	.....	7	1	3	....	2	.....	.....	.....	.....	.....	3	.....	.....	7	68
.....	.....	1	....	1	....	1	....	2	1	.....	1	1	.....	1	18	69
.....	.....	*3*	....	.....	....	*20*	*1*	*2*	.....	.....	.....	*2*	.....	*2*	*28*	*32*
2	....	3	....	.....	....	.....	.....	1	.....	.....	.....	1	.....	.....	7	70
.....	.....	*2*	....	.....	....	7	.....	.....	*2*	.....	.....	*1*	.....	.....	*12*	*34*
1	....	.....	....	*2*	....	7	1	.....	2	.....	.....	1	.....	4	25	71
1	....	1	1	2	1	1	....	4	1	.....	.....	.....	2	.....	24	72
1	....	2	....	.....	....	.....	.....	4	1	.....	.....	1	.....	5	16	33
1	....	.....	....	4	....	.....	.....	.....	.....	.....	.....	.....	1	10	8	73
4	....	4	....	56	2	12	3	13	8	.....	.....	4	3	100	73	74
.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
1	....	.....	....	1	....	2	1	12	15	1	....	6	.....	1	180	01
23	1	1	....	.....	....	.....	.....	7	7	.....	1	1	.....	1	97	58
298	....	**33**	....	**65**	**1**	**33**	**1**	**104**	**89**	**8**	**6**	**30**	**30**	**97**	**435**	**15**
.....	.....	.....	....	.....	....	.....	.....	1	1	.....	.....	1	.....	.....	14	50
.....	.....	.....	....	.....	....	.....	.....	*1*	*1*	.....	*1*	*2*	.....	.....	9	*20*
2	....	1	....	.....	....	.....	.....	1	1	.....	.....	1	.....	5	20	51
.....	.....	.....	....	2	....	4	....	2	1	.....	.....	.....	.....	2	6	52
.....	.....	.....	....	.....	....	.....	.....	*4*	.....	.....	.....	.....	.....	*5*	*12*	*21*
.....	.....	.....	....	.....	....	.....	.....	.....	1	.....	.....	.....	.....	.....	31	53
5	....	.....	....	.....	....	8	....	4	3	.....	.....	.....	1	6	32	54
1	....	.....	....	5	....	1	....	6	1	2	.....	.....	1	3	15	55
9	....	1	....	.....	....	.....	.....	.....	.....	1	....	1	.....	20	9	56
.....	.....	1	....	.....	....	.....	.....	.....	.....	.....	.....	2	.....	.....	6	57
1	....	13	....	.....	....	12	1	8	5	2	2	3	16	2	70	58
.....	.....	.....	....	.....	....	.....	.....	*3*	*3*	.....	.....	*1*	*5*	*4*	*36*	*22*
.....	.....	1	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	59
17	....	1	....	.....	....	1	....	7	.....	.....	.....	.....	.....	.....	10	60
127	....	*19*	....	.....	....	*2*	....	*19*	*7*	*1*	....	*1*	*2*	*26*	*22*	*23*
3	....	*2*	....	*3*	....	.....	.....	*34*	*44*	*1*	*1*	*1*	.....	.....	*18*	*24*
175	*1*	*24*	*1*	*10*	....	*2*	....	*1,235*	*186*	*20*	*2*	*2*	.....	*9*	*45*	*24*
.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	61
5	....	.....	....	.....	....	.....	.....	1	4	.....	.....	.....	.....	1	2	62
2	....	.....	....	.....	....	.....	.....	*1*	.....	.....	.....	*2*	.....	.....	*6*	*25*
.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*26*
.....	.....	.....	....	.....	....	.....	.....	2	1	.....	1	1	.....	.....	14	63
2	....	.....	....	39	1	1	....	3	3	.....	.....	7	4	.....	42	64
2	....	.....	....	*10*	....	*3*	....	*4*	*3*	*1*	....	*2*	.....	*3*	*22*	*27*
11	....	.....	....	.....	....	.....	.....	2	1	.....	1	2	.....	1	15	65
19	....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	2	.....	*3*	*6*	*28*
6	....	.....	....	7	....	.....	.....	1	1	.....	.....	1	1	12	12	66
85	....	.....	....	.....	....	1	....	.....	.....	.....	.....	.....	.....	3	4	67
1	....	.....	....	.....	....	.....	.....	.....	8	.....	.....	.....	.....	.....	1	60

for complete total. ‡ Village of Saranac Lake located in two counties, Essex and Franklin.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (stillbirths excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
16 FRANKLIN COUNTY	45,717	**46,181**	**1,024**	**37**	**807**	**2,029**	**103**	**27**	**307**	**29**	**8**
50 Altamont	1,624	570	71	1	33	4	8	4	7	...	...
20 Tupper Lake, village	*3,067*	*3,910*	*84*	*3*	*36*	*8*	*7*	*4*	*7*	...	...
51 Bangor	1,946	1,795	45	2	33	2	7	1	17	...	...
25 North Bangor, village	.....	*384*	.....	.....	.....	.....	.....	.....	.....	.....	.....
52 Belmont	2,341	2,031	51	2	30	3	7	1	15	...	...
53 Bombay	2,588	1,337	38	1	33	3	4	1	16	1	...
54 Brandon	872	860	32	2	9	1	1	...	6	...	...
55 Brighton	741	777	14	...	16	52	...	...	2	...	...
56 Burke	1,772	1,835	28	...	9	9	...	1	5	...	...
57 Chateaugay	1,795	1,707	50	...	26	54	2	2	15	...	...
21 Chateaugay, village	*1,045*	*1,196*	*23*	*1*	*19*	*71*	*2*	...	*13*	...	...
58 Constable	1,323	1,331	22	1	18	4	3	...	14	1	1
59 Dickinson	1,609	1,514	40	...	29	38	7	2	14	...	...
60 Duane	300	255	7	...	1	.....	.....	.....	.....	.....	.....
61 Fort Covington	1,151	1,217	36	1	20	4	2	1	15	1	...
22 Fort Covington, village	*877*	*828*	*14*	...	*15*	*4*	*2*	...	*10*	...	...
62 Franklin	1,447	1,378	28	1	17	31	1	1	8	...	...
63 Harrietstown	856	701	18	...	12	34	1	...	1	...	...
*23 *Saranac Lake village (1560,*	*1,562)*										
(pt.	*3,897*	*4,015)*	*76*	*2*	*177*	*1,433*	*4*	*1*	*20*	*1*	...
64 Malone	3,687	3,851	64	5	55	11	9	2	30	1	1
24 Malone, village	*6,467*	*7,404*	*165*	*6*	*145*	*74*	*19*	*5*	*55*	*17*	*5*
65 Moira	2,346	2,413	47	1	35	67	6	...	19	...	...
66 Santa Clara	675	525	6	...	3	3	1	.....	.....	.....	.....
67 Waverly	2,170	2,133	43	4	19	116	5	1	10	5	1
68 Westville	1,121	1,128	22	4	17	3	5	...	8	2	...
Indian Reservation	*.....	1,086	.....	.....	.....	.....	.....	.....	.....	.....	.....
17 FULTON COUNTY	44,534	**45,625**	**884**	**39**	**700**	**579**	**72**	**20**	**371**	**7**	**1**
01 Gloversville, city	20,642	**21,178**	**474**	**25**	**350**	**238**	**39**	**11**	**161**	**3**	**1**
02 Johnstown, city	10,447	**10,687**	**201**	**6**	**141**	**264**	**17**	**4**	**74**	...	...
50 Bleecker	500	498	2	1	1	3	1	.....	.....	.....	.....
51 Broadalbin	1,845	2,030	35	...	26	8	1	1	15	2	...
52 Caroga	441	516	3	...	7	.....	.....	.....	6	.....	.....
53 Ephratah	1,312	1,288	24	...	30	8	2	...	22	1	...
54 Johnstown	2,511	2,694	39	1	46	.....	4	1	26	...	...
55 Mayfield	1,475	1,500	21	2	21	9	1	3	13	...	...
20 Mayfield, village	*590*	*595*	*10*	*1*	*5*	*2*	...	...	*3*	*1*	...
56 Northampton	1,098	596	17	1	15	13	1	...	12	...	...
21 Northville, village	*1,130*	*1,635*	*15*	*1*	*24*	*20*	*2*	...	*16*	...	...
57 Oppenheim	1,066	974	16	...	12	11	2	...	8	...	...
(22) Dolgeville, village	*(pt. 175*	*187)*	*4*	...	*3*	.....	.....	.....	*1*	.....	.....
[22†Dolgeville, village (2158)		*2,685*	*3,326]*	*74*	*2*	*58*	*196*	*7*	*3*	*25*	...	...
58 Perth	695	713	12	...	11	.....	1	...	8	...	...
59 Stratford	607	534	11	1	8	3	1	...	6	...	...
18 GENESEE COUNTY	37,615	**40,707**	**841**	**38**	**548**	**588**	**66**	**13**	**284**	**31**	**3**
01 Batavia, city	11,613	**13,278**	**341**	**17**	**244**	**285**	**38**	**5**	**98**	**12**	**1**
50 Alabama	2,231	1,697	34	1	21	7	2	1	13	...	...
51 Alexander	1,150	1,144	14	1	12	9	1	...	6	...	...
20 Alexander, village	*212*	*259*	*5*	*1*	*2*	.....	.....	.....	*1*	.....	.....
52 Batavia	2,217	2,062	31	...	25	18	2	...	17	...	...
53 Bergen	994	1,077	20	1	8	19	...	...	6	...	...
21 Bergen, village	*637*	*639*	*6*	...	*4*	*16*	*1*	...	*3*	...	...
54 Bethany	1,270	1,394	25	1	24	4	2	...	15	...	...
55 Byron	1,520	1,501	29	1	19	.....	1	...	11	...	...
56 Darien	1,779	2,013	28	2	21	45	.....	.....	15	...	...
57 Elba	1,033	1,315	22	5	17	10	...	1	12	2	...
22 Elba, village	*351*	*439*	*4*	...	*6*	*7*	.....	.....	*6*	*1*	...
58 Leroy	1,671	1,746	31	...	18	9	...	2	10	3	...
23 Leroy, village	*3,771*	*4,084*	*90*	*3*	*43*	*125*	*7*	*2*	*26*	*12*	*2*
59 Oakfield	879	950	32	1	14	2	4	1	6	...	...
24 Oakfield, village	*1,236*	*1,307*	*51*	...	*11*	*12*	*2*	*1*	*5*	...	...

* See Saranac Lake, Essex county, for complete total. † Dolgeville, village, located

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
452	**3**	**34**	**1**	**70**	**8**	**62**	**7**	**1,265**	**197**	**25**	**11**	**36**	**15**	**92**	**521**	**16**
1	....	....	....	....	1	1	1	1	4	1	1	1	1	.....	24	50
....	....	*1*	....	....	....	*4*	*3*	*3*	*5*	.....	....	*3*	*1*	.....	*26*	*20*
....	....	....	....	....	....	1	....	.....	.....	.....	....	1	2	1	30	51
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	....	.....	....	*25*
....	....	....	....	....	....	....	....	2	2	.....	....	2	2	1	24	52
....	....	....	....	....	....	....	....	2	7	.....	....	....	.....	.....	26	53
....	....	....	....	....	....	....	....	1	1	.....	....	....	.....	.....	8	54
30	....	....	....	11	....	1	....	.....	7	1	....	1	.....	9	8	55
1	....	....	....	5	....	1	....	2	1	.....	2	....	.....	.....	6	56
45	1	....	....	....	....	5	....	4	4	.....	....	2	.....	.....	19	57
51	....	....	....	....	....	*11*	....	*1*	.....	.....	....	*1*	*1*	*8*	*17*	*21*
....	....	2	....	....	1	....	....	1	.....	.....	....	1	.....	.....	15	58
....	....	....	....	32	2	....	....	1	1	.....	....	2	.....	5	24	59
....	....	....	....	....	....	....	....	....	....	.....	....	....	.....	.....	1	60
....	....	....	....	....	....	....	....	3	.....	.....	....	1	.....	.....	19	61
....	....	....	....	....	....	....	....	*3*	*3*	*1*	....	*1*	*1*	.....	*10*	*22*
28	1	....	....	....	....	2	1	.....	5	.....	....	1	.....	1	9	62
22	....	3	....	....	....	....	....	9	3	.....	....	1	.....	.....	8	63
172	*1*	*22*	*1*	*7*	....	*2*	....	*1,201*	*142*	*19*	*1*	*1*	.....	*9*	*31*	*23*
....	....	....	....	....	1	7	....	3	2	.....	1	5	3	.....	42	64
3	....	*2*	....	*1*	*1*	*24*	*2*	*25*	*10*	*1*	*5*	*6*	*3*	*1*	*113*	*24*
54	....	2	....	8	....	1	....	1	1	.....	....	4	.....	1	30	65
....	....	....	....	....	....	1	....	.....	.....	.....	....	....	.....	2	3	66
45	....	2	....	6	1	1	....	1	.....	2	1	1	1	54	14	67
....	....	....	....	....	1	....	....	1	1	.....	....	1	.....	.....	14	68
....	....	....	....	....	....	....	....	....	....	.....	....	....	.....	.....	....	
171	....	**32**	....	**108**	**6**	**74**	**7**	**79**	**36**	**5**	**8**	**57**	**8**	**103**	**577**	**17**
39	....	**18**	....	**57**	**3**	**68**	**6**	**44**	**14**	.....	**3**	**26**	**6**	**9**	**291**	**01**
114	....	**1**	....	**43**	**1**	**3**	....	**14**	**4**	**4**	**5**	**13**	**2**	**85**	**116**	**02**
....	....	3	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	1	50
....	....	2	....	....	....	1	1	3	2	.....	....	2	.....	.....	21	51
....	....	....	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	6	52
5	....	....	....	....	....	....	....	2	1	.....	....	2	.....	.....	27	53
....	....	....	....	....	1	....	....	.....	11	.....	....	5	.....	.....	29	54
....	....	7	....	1	1	....	....	.....	1	.....	....	....	.....	1	19	55
1	....	....	....	....	....	....	....	.....	.....	.....	....	*2*	.....	.....	*3*	*20*
2	....	....	....	1	....	1	....	6	.....	1	....	....	.....	2	15	56
2	....	....	....	*6*	....	*1*	....	*8*	*1*	.....	....	*4*	.....	*3*	*19*	*21*
8	....	1	....	....	....	....	....	2	.....	.....	....	....	.....	.....	12	57
....	....	....	....	....	....	....	....	.....	*1*	.....	....	....	.....	.....	*2*	*(22)*
26	....	*7*	....	*47*	*1*	*15*	*5*	*5*	*5*	*3*	*1*	*6*	*2*	*93*	*40*	*22*
....	....	....	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	10	58
....	....	....	....	....	....	....	....	.....	1	.....	....	1	.....	3	6	59
97	**2**	**107**	....	**38**	**1**	**26**	**3**	**34**	**13**	**2**	**2**	**28**	**14**	**253**	**482**	**18**
10	....	**44**	....	**18**	**1**	**8**	**1**	**20**	**9**	**2**	....	**10**	**8**	**171**	**214**	**01**
....	....	1	....	....	....	4	1	.....	.....	.....	....	....	.....	2	20	50
....	....	2	....	4	....	2	....	1	.....	.....	....	4	.....	.....	8	51
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	*2*	*20*
3	....	3	....	2	....	....	....	2	.....	.....	....	1	.....	8	24	52
10	....	6	....	....	....	2	....	1	1	.....	....	....	.....	.....	7	53
....	....	*11*	....	....	....	*4*	....	.....	.....	.....	....	*1*	.....	*1*	*3*	*21*
....	....	1	....	....	....	....	....	2	2	.....	1	2	.....	1	19	54
....	....	....	....	....	....	....	....	.....	.....	.....	....	3	1	.....	15	55
....	....	....	....	10	....	3	....	3	.....	.....	....	....	.....	29	21	56
3	1	1	....	1	....	....	....	.....	.....	.....	....	....	.....	3	16	57
....	....	....	....	*3*	....	....	....	.....	.....	.....	....	....	.....	*3*	*6*	*22*
5	....	1	....	....	....	....	1	.....	1	.....	....	1	.....	.....	15	58
66	*1*	*13*	....	....	....	*2*	....	*3*	.....	.....	....	*2*	*2*	*29*	*36*	*23*
....	....	1	....	....	....	....	....	1	.....	.....	....	....	2	.....	12	59
....	....	*10*	....	....	....	....	....	.....	.....	.....	....	....	.....	*2*	*11*	*24*

in two counties, Fulton and Herkimer. Total for entire village given in bracketed line.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census April 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
GENESSEE COUNTY—(*Concluded*)											
60 Pavilion	1,462	1,615	23	1	15	2	...	...	10	...	...
61 Pembroke	1,888	1,958	25	2	22	5	2	...	13	1	...
25 Corfu, village	*413*	*515*	*10*	...	*8*	*11*	*2*	...	*3*	...	...
62 Stafford	1,288	1,259	20	1	14	2	2	...	8	...	...
Indian Reservation	*	455	...	...	...	...	...	...	...	...	...
01 State School for the Blind, Batavia			...	...	...	16	...	...	...	...	...
19 GREENE COUNTY	**30,214**	**30,091**	**453**	**20**	**500**	**338**	**39**	**15**	**302**	**39**	**3**
50 Ashland	640	658	12	...	13	4	1	...	9	...	...
51 Athens	764	800	13	...	8	6	...	1	6	...	...
20 Athens, village	*1,956*	*1,925*	*32*	*1*	*28*	*20*	*3*	*1*	*15*	*7*	...
52 Cairo	1,841	1,967	22	...	61	20	2	...	47	2	...
53 Catskill	3,770	3,650	58	1	56	44	8	1	35	5	1
21 Catskill, village	*5,296*	*5,371*	*89*	*6*	*97*	*57*	*10*	*4*	*52*	*14*	*1*
54 Coxsackie	1,126	1,144	24	3	14	13	1	...	10	1	1
22 Coxsackie, village	*2,494*	*2,309*	*41*	*3*	*47*	*13*	9	...	*27*	...	...
55 Durham	1,475	1,363	10	2	23	8	1	1	8	1	...
56 Greenville	1,556	1,550	24	1	22	77	1	...	14	1	...
57 Halcott	331	353	1	...	1	4	...	...	1	...	...
58 Hunter	1,631	1,781	23	...	27	7	1	1	17	...	...
23 Hunter, village	*408*	*405*	*6*	...	*7*	...	1	...	2	...	...
24 Tannersville, village	*660*	*758*	*13*	...	*13*	...	...	1	7	...	...
59 Jewett	1,057	1,014	14	...	12	3	...	1	5	2	...
60 Lexington	1,054	926	13	2	14	34	...	2	9	1	...
61 New Baltimore	1,936	1,840	18	1	22	22	...	1	14	5	...
62 Prattsville	781	887	19	...	5	...	...	...	2	...	...
63 Windham	1,438	1,390	21	...	30	6	1	1	22	...	...
20 HAMILTON COUNTY	**4,373**	**4,491**	**73**	**2**	**42**	**111**	**3**	**1**	**25**	**4**	...
50 Arietta	232	319	4	...	...	...	...	...	...	...	...
51 Benson	143	155	2	...	1	1	1	...	...	...	...
52 Hope	258	250	2	...	2	...	...	...	2	...	...
53 Indian Lake	1,045	1,086	19	1	12	11	1	1	8	2	...
54 Inlet	197	219	2	...	1	2	...	...	...	2	...
55 Lake Pleasant	458	429	7	1	3	...	1	...	2	...	...
56 Long Lake	1,149	1,058	19	...	7	97	...	...	3	...	...
57 Morehouse	149	133	4	...	1	...	...	...	1	...	...
58 Wells	742	842	14	...	14	...	...	...	9	...	...
21 HERKIMER COUNTY	**56,356**	**64,109**	**1,631**	**39**	**1,034**	**1,725**	**149**	**43**	**455**	**28**	**4**
01 Little Falls, city	**12,273**	**13,022**	**417**	**9**	**230**	**277**	**42**	**12**	**73**	**6**	**4**
50 Columbia	1,071	1,090	8	...	27	14	2	...	22	1	...
51 Danube	941	1,050	17	1	14	5	3	...	9	...	...
52 Fairfield	948	957	20	...	7	14	1	1	2	...	...
20 Middleville, village (59)	*625*	*710*	*26*	*1*	*11*	*14*	*1*	...	*7*	...	...
53 Frankfort	1,802	1,749	45	1	39	24	10	1	15	1	...
21 Frankfort, village	*3,303*	*4,213*	*142*	*2*	*51*	*96*	*15*	*6*	*16*	*1*	...
54 German Flats	1,493	1,332	23	...	14	21	1	...	8	2	...
22 Ilion, village	*6,588*	*8,900*	*218*	*6*	*139*	*433*	*13*	*1*	*53*	*3*	...
23 Mohawk, village	*2,079*	*2,577*	*53*	...	*34*	*144*	*4*	*1*	*19*	...	...
55 Herkimer	1,277	1,450	31	2	59	21	1	1	30	1	...
24 Herkimer, village	*7,520*	*9,577*	*303*	*6*	*153*	*172*	*26*	*10*	*62*	*2*	...
56 Litchfield	803	836	10	...	13	3	...	...	11	...	...
57 Little Falls	638	627	8	...	5	7	...	1	2	...	...
58 Manheim	845	746	15	...	8	4	...	...	5	...	...
(*25*)†*Dolgeville (1757)*	(*pt.2,510*	*3,139*)	*70*	*2*	*55*	*196*	*7*	*3*	*24*	...	...
59 Newport (20)	560	627	11	1	6	42	1	...	5	...	...
26 Newport, village	*583*	*697*	*7*	...	*14*	*94*	*3*	*1*	*7*	...	...
27 Poland, village (62)	*332*	*315*	*9*	...	*2*	*2*	...	...	*1*	...	...
60 Norway	642	597	16	1	15	21	3	2	6	5	...
61 Ohio	527	496	9	...	11	7	...	...	8	...	...

* Distributed by towns in U. S. Census

District numbers, population (U. S. Census, April 15, 1910, *and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution:* **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 30–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
....	....	....	....	....	....	....	....	1	.....	.....	....	1	.....	1	14	60
....	....	3	....	....	....	....	....	.....	.....	.....	1	2	.....	1	19	61
....	....	*10*	....	....	....	*1*	....	.....	.....	.....	....	....	*1*	.....	*7*	*25*
....	....	....	....	....	....	....	....	.....	.....	.....	....	1	.....	2	13	62
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	....	01
....	....	....	....	1	....	....	....	.....	.....	.....	....	....	.....	1	....	...
103	....	**16**	....	**41**	**3**	**8**	**1**	**55**	**36**	**7**	**7**	**34**	**10**	**69**	**406**	**19**
....	....	1	....	....	....	....	....	3	2	.....	1	....	.....	.....	10	50
1	....	....	....	2	....	1	....	2	1	.....	....	1	.....	.....	6	51
10	....	....	....	*2*	....	*1*	....	.....	*4*	.....	....	*3*	.....	.....	*21*	*20*
....	....	....	....	2	....	1	....	7	7	2	....	6	1	6	47	52
1	....	....	....	19	3	1	....	7	8	1	2	2	2	10	43	53
4	....	*1*	....	*12*	....	*2*	....	*6*	*4*	.....	....	*7*	*4*	*18*	*81*	*21*
8	....	....	....	....	....	....	....	3	1	.....	....	1	.....	1	11	54
1	....	*3*	....	....	....	....	....	*7*	*4*	*1*	*1*	*1*	*1*	*1*	*40*	*22*
5	....	....	....	....	....	....	....	2	1	.....	....	3	.....	.....	19	55
59	....	1	....	1	....	1	....	8	2	2	1	2	.....	13	17	56
3	....	1	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	1	57
3	....	....	....	....	....	....	....	2	.....	.....	....	3	.....	2	24	58
....	....	....	....	....	....	....	....	.....	*2*	.....	....	....	.....	.....	*5*	*23*
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	*13*	*24*
1	....	....	....	....	....	....	....	.....	2	.....	....	1	.....	.....	9	59
13	....	3	....	2	....	....	....	2	.....	.....	....	2	.....	13	12	60
2	....	6	....	1	....	1	1	3	1	1	1	....	.....	3	19	61
....	....	....	....	....	....	....	....	.....	.....	.....	1	1	.....	.....	3	62
1	....	....	....	....	....	....	....	3	2	.....	....	1	2	2	25	63
6	....	**2**	....	**93**	....	**1**	**1**	**3**	**3**	**1**	....	**3**	.....	**1**	**35**	**20**
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	1	50
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	1	1	51
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	2	52
6	....	1	....	....	....	1	1	1	.....	.....	....	....	.....	.....	11	53
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	1	54
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	3	55
....	....	1	....	93	....	....	....	2	1	1	....	2	.....	.....	4	56
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	1	57
....	....	....	....	....	....	....	....	.....	2	.....	....	1	.....	.....	11	58
872	**7**	**38**	**1**	**273**	**4**	**49**	**8**	**123**	**53**	**15**	**16**	**65**	**40**	**327**	**836**	**21**
126	**1**	**6**	....	**76**	**1**	**8**	**1**	**24**	**8**	.....	**4**	**12**	**15**	**31**	**184**	**01**
13	....	....	....	....	....	....	....	.....	1	.....	....	1	1	.....	24	50
1	....	1	....	1	1	....	....	1	1	.....	1	1	.....	1	10	51
6	....	....	....	3	....	1	....	4	1	.....	....	....	.....	.....	6	52
10	....	....	....	....	....	....	....	*4*	*1*	.....	....	....	.....	.....	*10*	*20*
8	....	2	....	1	....	....	....	3	2	.....	....	3	3	9	31	53
9	....	*2*	....	*14*	....	*1*	....	*3*	*1*	*3*	*2*	*2*	*3*	*63*	*43*	*21*
5	....	2	....	11	....	....	....	1	.....	.....	....	.....	.....	.....	14	54
390	*3*	*3*	....	*9*	....	*3*	....	*12*	*9*	*3*	*2*	*9*	*1*	*10*	*115*	*22*
52	*1*	*4*	....	*50*	....	*1*	....	*1*	*2*	*1*	....	*3*	.....	*35*	*28*	*23*
5	....	1	....	....	....	....	....	14	8	.....	1	3	.....	.....	47	55
50	*1*	*6*	*1*	*44*	*1*	*4*	....	*20*	*10*	*2*	*4*	*11*	*9*	*44*	*116*	*24*
1	....	....	....	....	....	1	....	1	.....	.....	....	1	.....	.....	12	56
....	....	1	....	3	....	1	....	2	.....	.....	....	....	.....	.....	5	57
2	....	....	....	....	....	....	....	1	.....	.....	....	....	.....	1	8	58
29	....	*7*	....	*47*	*1*	*15*	*5*	*5*	*2*	*3*	*1*	*6*	*2*	*93*	*38*	*25*
35	....	....	....	....	....	....	....	.....	.....	.....	....	2	.....	7	4	59
90	*1*	....	....	....	....	....	....	.....	*1*	.....	....	*1*	.....	*4*	*11*	*26*
1	....	....	....	....	....	....	....	.....	.....	*1*	....	....	.....	.....	*2*	*27*
12	....	....	....	....	....	....	....	2	.....	1	1	....	1	1	13	60
4	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	3	11	61

See Dolgeville, Fulton county, for complete total.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (stillbirths excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
HERKIMER COUNTY—(*Concluded*)											
62 Russia (27)	1,161	1,225	33	1	11	6	4	1	4	1	...
28 Cold Brook, village	*358*	*274*	*6*	...	*6*	*3*	*1*	....	*5*	....	....
63 Salisbury	1,468	1,643	35	1	24	21	3	2	11	4	...
64 Schuyler	1,227	1,130	21	1	16	14	3	....	7	....	....
65 Stark	897	906	12	...	17	2	1	....	12	....	....
66 Warren	1,071	1,288	17	2	14	25	1	....	11	....	....
67 Webb	785	759	17	1	11	7	3	....	3	....	....
29 Old Forge, village	*465*	*515*	*12*	...	*5*	*32*	....	....	*1*	*1*	...
68 Wilmurt	178	227	6	...	3	....	....	....	1	....	....
69 Winfield	660	647	4	1	6	1	....	....	5	....	....
30 West Winfield, village	*726*	*788*	*10*	...	*14*	*3*	....	....	*10*	....	....
22 JEFFERSON COUNTY	80,382	**81,009**	**1,694**	**60**	**1,346**	**2,885**	**178**	**58**	**693**	**75**	**7**
01 Watertown, city	26,730	**26,895**	**718**	**26**	**558**	**1,160**	**86**	**27**	**218**	**36**	**3**
50 Adams	1,670	1,708	21	2	25	9	2	1	16	....	...
20 Adams, village	*1,458*	*1,571*	*22*	...	*19*	*7*	*2*	....	*15*	*1*	...
51 Alexandria	2,360	2,293	45	2	28	26	3	1	18	1	1
21 Alexandria Bay, village	*1,899*	*2,062*	*45*	...	*22*	*245*	*3*	*1*	*10*	*7*	...
52 Antwerp	1,874	1,705	22	...	19	5	....	....	15	1	...
22 Antwerp, village	*974*	*1,057*	*14*	*1*	*16*	*11*	*1*	*2*	*8*	*2*	1
53 Brownville	1,234	1,181	17	1	11	20	....	1	9	1	...
23 Brownville, village	*854*	*885*	*17*	*3*	*18*	*71*	*3*	*2*	*4*	....	...
24 Dexter, village	*1,005*	*1,145*	*28*	*1*	*17*	*31*	*3*	*1*	*10*	*3*	...
25 Glen Park, village	*522*	*650*	*12*	...	*11*	*36*	*4*	*3*	*1*	....	....
54 Cape Vincent	1,420	1,412	20	...	12	21	2	....	7	....	....
26 Cape Vincent, village	*1,155*	*1,102*	*17*	...	*17*	*7*	*2*	....	*11*	*3*	...
55 Champion	1,311	1,403	29	1	13	27	1	....	8	....	....
27 West Carthage, village	*1,393*	*1,587*	*27*	...	*24*	*89*	*1*	....	*20*	....	....
56 Clayton	2,087	2,097	39	3	24	100	2	....	13	1	...
28 Clayton, village	*1,941*	*1,879*	*23*	*2*	*21*	*287*	*2*	*1*	*13*	*1*	...
57 Ellisburg	2,258	2,274	42	1	41	26	8	3	25	2	...
29 Belleville, village	*344*	*280*	*4*	...	*7*	*2*	....	....	*7*	....	....
30 Ellisburg, village	*702*	*316*	*3*	...	*13*	*7*	....	....	*10*	....	....
31 Mannsville, village	*330*	*617*	*3*	...	*8*	....	*1*	....	*7*	....	....
58 Henderson	1,145	1,071	34	...	17	22	2	1	10	1	...
32 Henderson, village	*340*	*380*	*3*	...	*12*	*2*	....	....	*10*	*1*	...
59 Hounsfield	1,349	1,364	36	...	17	101	3	....	8	1	1
33 Sacketts Harbor, village	*868*	*689*	*9*	...	*8*	*96*	....	....	*2*	....	....
60 Le Ray	2,070	2,053	44	1	32	20	4	2	19	....	....
34 Black River, village (67)	*916*	*857*	*23*	...	*17*	*2*	*2*	....	*12*	....	....
61 Lorraine	940	993	20	1	19	20	3	1	14	....	....
62 Lyme	1,247	1,187	10	1	10	.....	1	....	7	....	....
35 Chaumont, village	*708*	*682*	*10*	...	*11*	*2*	*2*	....	*7*	*1*	*1*
63 Orleans	2,160	2,269	33	2	30	35	3	....	20	....	....
64 Pamelia	976	980	15	...	22	16	....	....	16	....	....
65 Philadelphia	798	746	18	2	6	3	....	....	4	....	....
36 Philadelphia, village	*842*	*847*	*10*	...	*18*	*1*	....	*1*	*13*	....	....
66 Rodman	1,123	1,167	10	...	20	3	2	....	14	1	...
67 Rutland (34)	1,431	1,394	24	...	24	2	3	1	18	....	....
68 Theresa	1,104	1,007	26	2	14	26	2	....	6	....	....
37 Theresa, village	*932*	*1,053*	*13*	...	*22*	*19*	*1*	*1*	*14*	*1*	...
69 Watertown	1,097	1,179	20	1	15	3	3	1	8	....	....
70 Wilna	2,655	2,522	67	6	39	85	7	5	11	5	...
38 Carthage, village	*3,563*	*3,871*	*91*	*1*	*62*	*233*	*14*	*2*	*32*	*5*	...
71 Worth	597	579	10	...	7	7	....	....	4	....	....
24 LEWIS COUNTY	24,849	**25,947**	**464**	**15**	**380**	**151**	**34**	**14**	**228**	**7**	**3**
50 Croghan	2,373	2,532	50	2	28	12	3	1	19	1	1
20 Croghan, village (62)	*621*	*659*	*14*	...	*7*	*3*	*1*	*1*	*5*	....	....
51 Denmark	1,304	1,421	20	2	17	16	1	1	9	1	1
21 Copenhagen, village	*585*	*695*	*5*	...	*13*	*1*	....	*1*	*8*	....	....
52 Diana	1,358	1,448	29	1	28	16	2	....	12	1	...
22 Harrisville, village	*921*	*991*	*20*	...	*17*	*26*	*1*	*1*	*9*	*1*	...

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
....	....	....	....	1	....	....	....	4	....	....	....	....	2	....	9	62
....	....	....	....	....	....	....	....	*1*	....	....	....	....	....	*2*	*6*	*28*
3	....	....	....	....	....	11	2	3	2	....	....	1	....	....	19	63
13	....	....	....	....	....	....	....	1	....	....	....	1	1	....	14	64
....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	15	65
1	....	....	....	6	....	1	....	....	....	....	....	2	1	17	11	66
2	....	....	....	....	....	2	....	2	....	1	....	1	1	....	9	67
6	....	*3*	....	*7*	....	....	....	*11*	*2*	....	....	....	....	*4*	*3*	*49*
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	68
....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	5	69
1	....	....	....	....	....	....	....	*2*	*1*	....	....	*3*	....	....	*10*	*30*
1526	**2**	**96**	....	**544**	**25**	**20**	**4**	**116**	**46**	**5**	**16**	**75**	**32**	**503**	**1139**	**22**
255	....	**18**	....	**408**	**16**	**8**	....	**79**	**25**	....	**9**	**33**	**21**	**356**	**451**	**01**
2	....	1	....	6	1	....	....	....	....	....	....	2	....	....	22	50
2	....	....	....	*2*	....	....	....	*2*	....	....	....	*1*	....	....	*18*	*20*
25	....	....	....	....	....	....	....	....	....	....	....	5	1	....	21	51
234	....	....	....	*1*	....	....	....	*2*	*1*	*1*	*1*	*2*	....	....	*18*	*21*
1	....	1	....	....	....	....	....	1	2	1	....	....	....	....	17	52
7	....	....	....	*1*	....	....	....	....	....	....	....	....	....	*1*	*15*	*22*
11	....	2	....	....	....	1	1	....	....	....	....	1	....	5	9	53
61	....	*2*	....	*3*	*1*	....	....	*1*	*2*	*1*	....	....	....	*3*	*15*	*23*
1	....	7	....	*9*	....	*2*	*1*	*3*	....	....	....	*1*	*2*	*6*	*13*	*24*
22	*1*	....	....	*13*	*2*	....	....	*1*	....	....	*1*	....	....	....	*7*	*25*
14	....	....	....	....	....	....	....	1	....	....	....	2	....	6	10	54
1	....	....	....	....	....	*1*	....	....	*1*	....	....	*1*	....	*2*	*15*	*26*
25	....	1	....	1	....	....	....	....	....	....	....	1	....	....	12	55
80	....	*2*	....	....	....	*2*	*1*	....	....	....	....	*1*	*1*	*6*	*21*	*27*
88	....	5	....	....	....	....	....	1	....	....	....	2	....	5	22	56
283	....	....	....	....	....	....	....	....	*1*	....	....	*1*	*1*	*3*	*18*	*28*
1	....	20	....	1	....	....	....	2	1	....	....	2	....	....	38	57
....	....	*2*	....	....	....	....	....	....	....	....	....	....	....	....	*7*	*29*
....	....	*7*	....	....	....	....	....	....	....	....	....	*1*	....	....	*12*	*30*
....	....	....	....	....	....	....	....	....	....	....	....	*1*	....	....	*7*	*31*
....	....	....	....	14	....	....	....	....	....	....	....	3	....	7	14	58
....	....	....	....	*1*	....	....	....	....	....	....	....	....	....	....	*12*	*32*
67	....	5	....	15	....	....	....	1	2	....	....	....	....	12	14	59
26	....	....	....	*21*	....	....	....	....	....	....	....	....	....	*49*	*8*	*33*
4	....	1	....	13	....	....	....	2	1	....	....	2	....	....	29	60
....	....	....	....	....	....	....	....	*1*	....	....	*1*	*1*	*1*	*1*	*14*	*34*
15	....	....	....	3	1	....	....	2	....	....	....	1	....	....	17	61
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	62
....	....	....	....	....	....	....	....	*1*	*1*	....	....	*1*	....	....	*8*	*35*
25	....	1	....	....	....	....	....	5	2	1	....	1	....	3	27	63
14	....	....	....	....	....	....	....	....	....	....	....	....	....	2	22	64
....	....	....	....	....	....	....	....	2	....	....	....	....	....	1	6	65
....	....	....	....	....	....	....	....	....	*1*	....	*1*	....	....	*1*	*16*	*36*
1	....	....	....	....	....	....	....	1	3	....	....	1	....	....	16	66
1	....	....	....	....	....	....	....	....	....	1	2	1	....	....	21	67
14	....	....	....	9	....	....	....	....	....	....	....	1	2	3	11	68
....	....	....	....	*16*	*1*	....	....	....	....	....	*1*	....	....	*2*	*20*	*37*
....	....	....	....	3	....	....	....	....	....	....	....	....	1	....	14	69
59	....	5	....	....	3	....	....	2	2	....	....	3	....	14	31	70
186	....	*14*	....	....	....	*6*	*1*	*6*	*1*	....	....	*3*	*2*	*16*	*55*	*38*
1	1	2	....	4	....	....	....	....	....	....	....	....	....	....	6	71
52	**2**	**14**	**1**	**13**	**2**	**11**	....	**17**	**10**	**1**	**3**	**24**	**3**	**36**	**332**	**24**
....	....	1	....	....	....	....	....	1	....	....	....	4	....	9	23	50
....	....	*1*	....	....	....	....	....	*1*	....	....	....	....	....	*1*	*7*	*20*
13	....	....	....	....	....	....	....	....	....	....	....	3	....	2	13	51
....	....	....	....	....	....	....	....	*1*	*1*	....	....	....	....	....	*12*	*21*
10	1	....	....	....	....	4	....	1	1	....	....	2	....	....	24	52
7	....	*5*	*1*	*5*	....	*6*	....	*1*	....	....	*1*	....	....	*1*	*15*	*22*

Table 17.—STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910–State Census June 1, 1915)			Total births (stillbirths excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
LEWIS COUNTY—(*Concluded*)											
53 Greig	807	758	11	...	6	6	1	....	3	....	...
54 Harrisburg	686	677	13	...	11	.....	.....	.....	7	....	...
55 High Market	409	390	10	1	7	2	1	....	5	....	...
56 Lewis	801	733	19	...	5	6	....	1	2	....	...
57 Leyden	1,010	1,066	17	...	16	5	3	1	8	....	...
23 Port Leyden, village (59)	*764*	*753*	*9*	*1*	*14*	*1*	.....	*1*	*9*	....	...
58 Lowville	935	860	23	...	20	1	1	1	23	....	...
24 Lowville, village	*2,940*	*3,244*	*35*	*2*	*48*	*19*	*3*	....	*35*	*1*	...
59 Lyonsdale (23)	809	822	17	1	8	2	1	....	5	....	...
25 Lyons Falls, village (67)	*759*	*863*	*18*	*1*	*19*	*4*	*4*	*1*	*7*	....	...
60 Martinsburg	1,546	1,761	31	3	24	4	3	....	13	2	1
61 Montague	531	489	8	...	5	3	....	2	2	....	...
62 New Bremen (20)	1,422	1,441	27	...	15	10	1	....	10	....	...
63 Osceola	456	467	16	...	6	2	.....	.....	4	....	...
64 Pinckney	806	804	15	...	6	.....	2	1	2	....	...
65 Turin	681	769	20	1	12	1	3	....	6	....	...
26 Turin, village	*349*	*339*	*3*	...	*8*	.....	.....	.....	*5*	....	...
66 Watson	757	771	11	...	15	6	.....	.....	9	....	...
67 West Turin (25)	812	803	20	...	8	.....	3	1	4	....	...
27 Constableville, village	*407*	*391*	*8*	...	*8*	*1*	.....	.....	*7*	....	...
25 LIVINGSTON COUNTY	38,037	**38,427**	**760**	**13**	**693**	**631**	**48**	**20**	**344**	**5**	**1**
50 Avon	1,379	1,432	28	2	20	14	3	2	11	....	...
20 Avon, village	*2,053*	*2,430*	*59*	...	*28*	*40*	*6*	*1*	*11*	....	...
51 Caledonia	958	861	17	1	10	52	1	....	6	....	...
21 Caledonia, village	*1,290*	*1,241*	*21*	*1*	*19*	*57*	*3*	....	*13*	....	...
52 Conesus	937	1,041	30	...	18	14	1	1	14	1	1
53 Geneseo	1,121	1,095	13	2	25	5	2	....	20	....	...
22 Geneseo, village	*2,067*	*2,253*	*39*	*1*	*27*	*12*	*2*	....	*20*	....	...
54 Groveland	2,820	1,699	28	...	23	13	....	1	7	....	...
55 Leicester	1,398	1,506	42	...	17	12	1	1	10	1	...
23 Moscow, village	*304*	*305*	*1*	...	*5*	*31*	.....	.....	*4*	*1*	...
56 Lima	1,202	1,196	15	1	9	48	....	1	4	....	...
24 Lima, village	*866*	*922*	*20*	...	*9*	*25*	.....	.....	*6*	*1*	...
57 Livonia	1,996	2,142	31	...	30	44	2	2	22	....	...
25 Livonia, village	*823*	*857*	*9*	*1*	*16*	*45*	*1*	*1*	*11*	....	...
58 Mount Morris	1,222	1,171	25	...	14	11	1	1	9	....	...
26 Mount Morris, village	*2,782*	*3,884*	*127*	*1*	*58*	*39*	*8*	*7*	*24*	....	...
59 North Dansville	390	272	4	...	1	4	.....	.....	1	....	...
27 Dansville, village	*3,938*	*4,018*	*74*	*1*	*65*	*3*	*7*	*1*	*36*	....	...
60 Nunda	1,318	1,149	17	1	26	30	1	....	16	....	...
28 Nunda, village	*1,043*	*1,140*	*18*	...	*21*	*3*	.....	.....	*18*	....	...
61 Ossian	730	666	14	...	7	.....	.....	.....	6	....	...
62 Portage	1,273	962	17	...	14	11	2	....	10	....	...
63 Sparta	985	894	18	...	10	14	.....	.....	6	....	...
64 Springwater	1,808	1,689	19	1	22	21	2	....	16	1	...
65 West Sparta	772	800	27	...	9	.....	.....	.....	8	....	...
66 York	2,562	2,802	47	...	36	.....	5	1	22	....	...
54 Craig Colony for Epileptics, Sonyea	.....	.....	.....	...	154	83	....	....	14	....	...
26 MADISON COUNTY	39,289	**41,742**	**778**	**20**	**666**	**715**	**58**	**17**	**413**	**7**	**2**
01 Oneida, city	8,317	**9,461**	**220**	**4**	**170**	**35**	**11**	**5**	**95**	**1**	...
50 Brookfield	2,008	1,930	29	...	30	40	3	2	15	4	1
20 Brookfield, village	*395*	*400*	*5*	...	*12*	*12*	*1*	....	*9*	....	...
51 Cazenovia	1,826	1,939	36	2	36	37	2	1	18	1	...
21 Cazenovia, village	*1,861*	*1,928*	*31*	*1*	*27*	*59*	*4*	....	*17*	....	...
52 DeRuyter	658	663	14	...	8	1	1	....	5	....	...
22 DeRuyter, village	*538*	*604*	*5*	...	*13*	.....	*1*	....	*8*	....	...
53 Eaton	1,917	1,979	38	3	55	80	4	2	36	....	...
23 Morrisville, village	*500*	*582*	*7*	*1*	*10*	*60*	....	*1*	*9*	....	...
54 Fenner	807	836	9	...	10	2	.....	.....	5	....	...
55 Georgetown	925	989	24	...	17	110	1	....	12	....	...

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles, 6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
....	....	....	....	5	....	....	....	....	....	....	....	....	....	1	6	53
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	11	54
1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	7	55
2	....	....	....	....	....	....	....	....	....	....	....	....	....	4	5	56
5	1	....	....	....	....	....	....	....	....	....	....	1	....	....	14	57
....	....	....	....	....	....	....	....	*1*	*1*	....	....	....	*1*	....	*12*	*23*
....	....	....	....	....	....	....	....	1	....	....	....	3	....	....	26	58
3	....	....	....	*2*	....	....	....	*6*	....	....	*1*	*5*	*1*	*7*	*41*	*24*
2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	8	59
....	....	....	....	....	....	....	....	*2*	*3*	....	....	*1*	....	*2*	*15*	*25*
....	....	....	....	....	....	....	....	....	2	....	....	2	....	2	19	60
1	....	....	....	1	1	....	....	1	....	....	....	....	....	....	4	61
6	....	1	....	....	....	....	....	1	....	....	....	1	....	2	14	62
2	....	....	....	....	....	....	....	....	1	....	....	....	....	....	5	63
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	64
....	....	....	....	....	1	1	....	....	....	....	....	....	....	....	11	65
....	....	....	....	....	....	....	....	....	....	....	....	*1*	....	....	*7*	*26*
....	....	6	....	....	....	....	....	....	1	....	1	....	....	....	13	66
....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	6	67
....	....	....	....	....	....	....	....	....	....	....	....	....	....	*5*	*8*	*27*
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	
312	**3**	**43**	....	**86**	**2**	**8**	....	**55**	**58**	**10**	**7**	**45**	**8**	**112**	**569**	**25**
4	....	....	....	6	....	....	....	1	1	....	....	2	....	3	17	50
7	....	*8*	....	*11*	*1*	*1*	....	*4*	*2*	....	....	*1*	*1*	*9*	*23*	*20*
48	....	....	....	....	....	....	....	....	1	....	....	2	....	4	7	51
54	....	....	....	*2*	....	*1*	....	....	*1*	....	....	*2*	*1*	....	*15*	*21*
4	....	3	....	2	....	....	....	2	1	....	....	2	....	2	14	52
2	....	....	....	....	....	....	....	....	....	....	....	2	1	3	22	53
6	....	....	....	....	....	....	....	....	*1*	....	....	*3*	....	*6*	*23*	*22*
8	....	4	....	....	....	....	....	1	4	....	....	....	....	....	19	54
1	....	....	....	....	....	1	....	1	....	....	1	1	....	8	15	55
....	....	....	....	....	....	....	....	*1*	....	....	....	*1*	....	*29*	*4*	*23*
37	....	8	....	....	....	....	....	....	1	....	....	1	....	3	7	56
20	....	*1*	....	....	....	....	....	*3*	*1*	....	....	*2*	....	....	*8*	*24*
4	....	5	....	22	....	....	....	....	2	1	....	4	....	12	24	57
3	....	*6*	....	*25*	....	....	....	*1*	....	....	....	*2*	....	*10*	*14*	*25*
9	....	....	....	1	1	....	....	....	....	....	1	....	1	1	11	58
32	*1*	....	....	*1*	....	*1*	....	*2*	*1*	*2*	*1*	*1*	*4*	....	*50*	*26*
3	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	59
2	....	*1*	....	....	....	....	....	....	....	....	....	*4*	....	....	*61*	*27*
19	....	....	....	1	....	....	....	1	2	....	....	3	....	9	21	60
....	....	....	....	....	....	....	....	*2*	....	....	....	*1*	....	*1*	*20*	*28*
....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	6	61
6	....	2	....	2	....	....	....	....	....	....	....	2	....	1	12	62
....	....	1	....	13	....	....	....	....	....	....	....	2	....	....	8	63
17	....	2	....	....	....	....	....	1	1	....	1	4	....	....	16	64
....	....	....	....	....	....	....	....	....	1	....	....	1	....	....	7	65
....	1	....	....	....	....	....	....	....	....	....	....	2	....	....	33	66
25	1	1	....	....	....	4	....	35	38	7	3	1	....	11	111	54
323	**1**	**72**	....	**85**	**1**	**15**	**4**	**37**	**27**	**6**	**5**	**55**	**8**	**164**	**563**	**26**
....	....	**17**	....	**1**	....	**6**	**2**	**8**	**5**	**1**	**2**	**13**	**5**	**1**	**143**	**01**
3	....	....	....	8	....	2	1	2	....	....	....	2	....	20	26	50
....	....	....	....	*8*	....	....	....	....	....	....	....	*2*	....	*4*	*10*	*20*
14	....	1	....	6	....	2	1	2	2	....	1	2	....	11	30	51
2	....	*2*	....	....	....	....	....	*2*	*1*	....	....	*2*	....	*53*	*24*	*21*
1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	7	52
....	....	....	....	....	....	....	....	....	*1*	....	....	*1*	....	....	*11*	*22*
60	....	3	....	....	....	2	....	4	4	....	1	1	....	2	49	53
58	*1*	....	....	*2*	....	....	....	....	....	....	....	*1*	....	....	*8*	*23*
....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	8	54
91	....	....	....	2	....	....	....	2	1	....	....	1	....	15	15	55

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
MADISON COUNTY—(*Concluded*)											
56 Hamilton	1,524	1,473	20	2	18	20	....	....	13	....	....
(24)*Earlville, village (0868)	(pt. 612	592)	8	....	10	64	....	....	8	....	....
25 *Hamilton, village*	1,689	1,586	23	....	23	14	1	....	20	....	....
57 Lebanon	1,079	1,116	25	....	10	19	3	....	5	....	....
58 Lenox	1,392	1,446	39	....	26	31	4	1	16	....	....
26 *Canastota, village*	3,247	3,849	84	2	58	17	11	3	31	1	....
27 *Wampsville, village*	212	222	....	....	4	....	....	....	3	....	....
59 Lincoln	985	950	18	1	12	3	1	....	9	....	....
60 Madison	1,617	1,519	29	1	26	15	2	....	17	....	....
28 *Madison, village*	309	317	1	....	6	2	....	....	6	....	....
61 Nelson	1,139	1,230	15	....	16	31	....	....	15	....	....
62 Smithfield	880	904	12	....	9	7	3	....	5	....	....
63 Stockbridge	1,485	1,544	24	1	17	19	3	1	9	....	....
64 Sullivan	2,689	2,609	53	2	34	22	1	1	23	....	....
29 *Chittenango, village*	678	1,074	9	....	9	15	1	....	4	....	1
27 MONROE COUNTY	**283,212**	**319,313**	**8,354**	**313**	**4,993**	**7,591**	**679**	**306**	**1941**	**92**	**9**
01 Rochester, city	**218,149**	**248,465**	**6,955**	**279**	**4,088**	**6,515**	**581**	**284**	**1534**	**72**	**8**
50 Brighton	3,998	2,974	43	1	147	41	3	3	12	....	....
51 Chili	2,071	2,050	26	....	25	15	3	....	13	2	....
52 Clarkson	1,549	1,657	37	2	19	12	3	1	6	....	....
53 Gates	4,862	5,498	190	7	68	152	17	3	22	....	....
54 Greece	5,839	8,492	244	4	128	140	13	2	76	3	....
20 *Charlotte, village*	1,839	2,302	1	....	....	....	....	....	....	....	....
55 Hamlin	2,184	2,458	52	1	19	51	3	....	11	....	....
56 Henrietta	1,972	2,083	21	1	31	14	1	2	18	2	....
57 Irondequoit	3,526	4,603	112	2	45	47	7	2	19	....	....
58 Mendon	1,585	1,638	29	1	18	14	3	....	11	1	....
21 *Honeoye Falls, village*	1,169	1,258	16	....	11	13	1	....	6	....	....
59 Ogden	2,143	1,952	36	3	23	4	2	....	14	1	....
22 *Spencerport, village*	1,000	848	10	....	11	9	....	1	9	1	....
60 Parma	2,327	2,451	49	1	22	17	4	....	12	....	....
23 *Hilton, village*	627	817	9	....	8	1	....	....	5	....	....
61 Penfield	2,977	2,967	49	1	31	78	4	1	16	....	....
62 Perinton	1,981	2,107	36	....	26	23	4	....	14	....	....
24 *East Rochester, village (63)*	2,398	3,471	106	1	26	94	8	....	5	....	....
25 *Fairport, village*	3,112	3,556	67	1	53	130	4	3	30	2	....
63 Pittsford (24)	1,504	1,534	12	1	10	8	....	....	6	....	....
26 *Pittsford, village*	1,205	1,376	20	....	12	7	....	3	5	....	....
64 Riga	1,288	1,257	16	1	19	11	3	....	12	....	....
27 *Churchville, village*	565	583	9	1	8	7	....	....	7	1	....
65 Rush	2,150	1,578	18	1	23	56	1	....	9	1	1
66 Sweden	1,306	1,267	18	....	12	10	1	....	6	1	....
28 *Brockport, village*	3,579	3,368	48	....	44	26	4	....	30	4	....
67 Webster	2,723	2,950	40	1	34	25	....	....	22	....	....
29 *Webster, village*	1,032	1,439	30	....	15	10	4	1	6	....	....
68 Wheatland	2,453	1,414	35	3	10	21	3	....	3	1	....
30 *Scottsville, village*	.....	900	20	....	7	40	2	....	2	....	....
01 Rochester State Hospital	.....	.....	.....	....	221	.....	.....	....	114	....	....
28 MONTGOMERY COUNTY	**57,567**	**61,030**	**1,406**	**50**	**886**	**914**	**126**	**45**	**381**	**12**	**1**
01 Amsterdam, city	**31,267**	**34,319**	**971**	**37**	**485**	**343**	**89**	**28**	**167**	**7**	....
50 Amsterdam	1,599	1,742	28	1	42	7	6	2	8	....	....
20 *Fort Johnson, village*	600	681	11	....	8	14	1	1	3	....	....
21 *Hagaman, village*	875	952	16	1	11	3	3	1	4	....	....
51 Canajoharie	1,616	1,549	31	....	20	2	1	....	15	....	....
22 *Canajoharie, village*	2,273	2,474	41	....	28	50	3	2	15	3	1
52 Charleston	900	898	13	....	11	5	....	....	9	....	....
53 Florida	1,904	1,912	28	2	22	31	1	1	13	....	....
54 Glen	1,190	1,110	14	....	10	32	....	....	5	....	....
23 *Fultonville, village*	812	955	14	....	20	26	2	1	10	....	....

* See Chenango county

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 30–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
5	....	3	....	7	....	....	....	3	.....	.....	....	1	.....	2	17	56
3	.....	.....	....	*41*	.....	.....	.....	*1*	.....	.....	.....	*2*	.....	*19*	*8*	*24*
3	.....	*1*	.....	.....	.....	.....	.....	*4*	.....	.....	.....	*2*	.....	*6*	*2*	*25*
3	....	3	....	4	.....	.....	.....	2	.....	.....	.....	.....	.....	7	10	57
6	....	22	....	1	1	....	....	1	3	1	....	2	1	.....	19	58
8	....	*5*	....	.....	.....	*2*	....	*1*	*2*	.....	.....	*6*	*1*	*1*	*4*	*26*
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*4*	*27*
.....	.....	2	.....	.....	.....	1	.....	.....	1	.....	.....	1	.....	.....	10	59
4	.....	.....	.....	6	.....	.....	.....	1	1	1	....	4	1	3	20	60
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*1*	*6*	*28*
2	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	2	.....	5	14	61
7	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	7	62
10	....	3	....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	15	63
8	....	9	....	.....	.....	.....	.....	1	2	2	1	2	.....	2	29	64
1	.....	*1*	.....	.....	.....	.....	.....	*2*	*3*	*1*	....	*2*	.....	*10*	*3*	*29*
2580	**39**	**2733**	**39**	**414**	**20**	**486**	**59**	**830**	**399**	**2**	**69**	**373**	**206**	**454**	**3780**	**27**
2147	**36**	**2432**	**36**	**380**	**18**	**423**	**53**	**778**	**254**	.....	**63**	**314**	**185**	**283**	**3121**	**01**
18	....	5	....	3	2	1	....	2	117	.....	1	1	.....	12	26	50
11	....	2	....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	23	51
.....	.....	4	....	.....	.....	7	2	1	.....	.....	.....	2	.....	.....	15	52
102	1	21	....	4	....	6	....	14	6	.....	1	3	5	5	52	53
50	....	65	1	.....	.....	6	....	7	5	1	1	7	5	8	109	54
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*20*
17	1	6	....	3	.....	.....	.....	1	1	.....	.....	3	.....	24	14	55
.....	.....	12	.....	.....	.....	.....	.....	.....	1	.....	.....	2	.....	.....	28	56
18	....	12	....	1	....	3	1	5	3	.....	....	5	3	8	33	57
5	....	8	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18	58
3	.....	*4*	.....	.....	.....	.....	.....	.....	.....	.....	.....	*1*	.....	.....	*10*	*21*
.....	.....	3	1	.....	.....	.....	.....	.....	1	.....	.....	2	.....	.....	19	59
2	.....	*2*	.....	*1*	....	*1*	....	*1*	.....	.....	.....	*1*	.....	*1*	*10*	*22*
6	....	10	....	.....	.....	1	.....	.....	.....	.....	.....	1	1	.....	20	60
.....	.....	.....	.....	.....	.....	.....	.....	*1*	*1*	.....	.....	*1*	.....	.....	*6*	*23*
46	.....	12	....	8	.....	1	1	1	1	.....	.....	4	1	10	24	61
11	....	3	....	3	....	3	.....	.....	.....	1	1	1	.....	2	24	62
8	....	*55*	....	*8*	....	*10*	*1*	*3*	*1*	.....	....	*1*	.....	*16*	*28*	*24*
41	*1*	*21*	....	*8*	....	*5*	....	*5*	*2*	.....	*2*	*6*	.....	*48*	*43*	*25*
3	....	2	....	.....	.....	.....	.....	3	1	.....	....	1	.....	.....	8	63
2	....	*4*	....	.....	.....	.....	.....	.....	.....	.....	.....	*1*	*1*	*1*	*10*	*26*
2	....	5	....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	3	19	64
1	....	*5*	....	.....	.....	.....	.....	.....	.....	.....	.....	*2*	.....	.....	*6*	*27*
19	....	27	....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	9	19	65
1	....	1	....	.....	.....	7	1	.....	.....	.....	.....	.....	.....	.....	11	66
5	....	*3*	....	.....	.....	*10*	....	*1*	*2*	.....	.....	*7*	.....	*5*	*3*	*28*
5	....	6	....	.....	.....	.....	.....	6	2	.....	.....	.....	.....	8	32	67
1	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	*2*	*2*	*9*	*11*	*29*
16	....	2	....	.....	.....	2	.....	.....	1	.....	.....	.....	1	.....	8	68
3	.....	*5*	*1*	.....	.....	.....	.....	.....	.....	.....	.....	*1*	*1*	*2*	*4*	*30*
.....	.....	.....	.....	.....	.....	.....	.....	.....	16	.....	5	4	.....	.....	89	01
459	**2**	**13**	....	**43**	**1**	**37**	**5**	**152**	**79**	**6**	**10**	**55**	**42**	**192**	**691**	**28**
85	**1**	**8**	....	**34**	....	**32**	**3**	**120**	**35**	**1**	**7**	**27**	**31**	**56**	**381**	**01**
2	.....	.....	.....	1	.....	.....	1	4	21	.....	.....	1	2	.....	17	50
.....	.....	.....	.....	.....	.....	*1*	*1*	.....	*1*	*1*	*1*	.....	.....	*12*	*5*	*20*
2	.....	.....	.....	.....	.....	.....	.....	.....	*1*	.....	.....	*1*	*2*	*1*	*7*	*21*
2	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	2	.....	.....	17	51
44	....	*1*	.....	.....	.....	*2*	.....	.....	*1*	.....	.....	*3*	.....	.....	*28*	*22*
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	2	10	52
4	.....	.....	.....	.....	.....	1	.....	.....	4	1	....	2	.....	25	10	53
3	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	1	.....	28	8	54
1	.....	.....	.....	.....	.....	.....	.....	*2*	*1*	.....	.....	*2*	*1*	*23*	*16*	*23*

for complete total.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)	Total births (stillbirths excluded)		Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
						Under 1	1 to 4	60 years and over	Cases	Deaths
MONTGOMERY COUNTY—*(Concluded)*										
55 Minden	1,883	1,706	26	25	15		1	19	1	
24 Fort Plain, village	*2,762*	*2,923*	*44*	*56*	*146*	*4*	*3*	*34*		
56 Mohawk	1,388	1,455	17	18	21	1		13		
25 Fonda, village	*1,100*	*1,120*	*26*	*14*	*23*			*8*		
57 Palatine	1,388	1,325	18	33	6	3		21		
26 Nelliston, village	*737*	*716*	*9*	*9*	*68*	*2*		*4*		
27 Palatine Bridge, village	*392*	*408*	*7*	*6*	*4*			*3*		
58 Root	1,512	1,327	21	18	17			14		
59 St. Johnsville	833	753	14	8	19	3		3		
28 St. Johnsville, village	*2,536*	*2,705*	*57*	*42*	*82*	*7*	*5*	*13*	*1*	
29 NASSAU COUNTY	**83,930**	**116,825**	**2,524**	**1,444**	**1,659**	**240**	**84**	**549**	**15**	**1**
50 Hempstead	27,513	33,167	610	380	269	66	29	139	10	
20 East Rockaway, village	*1,200*	*1,607*	*23*	*13*	*40*			*5*		
21 Floral Park, village (51)	*1,225*	*1,771*	*32*	*23*	*42*	*4*	*1*	*10*		
22 Freeport, village	*4,836*	*7,463*	*123*	*81*	*379*	*8*	*1*	*37*	*1*	
23 Hempstead, village	*4,964*	*6,073*	*96*	*65*	*117*	*8*	*2*	*31*	*1*	
24 Lawrence, village	*1,189*	*1,870*	*22*	*13*	*4*	*1*		*8*		
25 Rockville Center, village	*3,667*	*5,223*	*85*	*69*	*63*	*7*	*4*	*35*		
29 Cedarhurst, village		*2,657*	*24*	*14*	*34*	*1*		*8*		
30 Lynbrook, village		*3,055*	*59*	*36*	*97*	*4*	*4*	*18*		
31 Long Beach, village		*662*	*8*	*8*	*16*			*2*		
*36 *Woodsburgh, village*		*168*								
51 North Hempstead (21)	15,553	19,888	545	222	321	55	16	73		
26 Mineola, village	*1,981*	*2,318*	*175*	*183*	*5*	*19*	*6*	*44*	*1*	*1*
32 Plandome, village		*255*	*1*	*3*	*13*	*1*		*1*		
*33 *Great Neck Est., village*		*175*								
*34 *Saddle Rock, village*		*71*								
35 Sands Point, village		*535*		*1*	*1*					
52 Oyster Bay	18,541	26,030	664	280	212	61	16	112	2	
27 Farmingdale, village	*1,567*	*1,856*	*28*	*25*	*15*	*5*	*1*	*7*		
28 Sea Cliff, village	*1,694*	*1,981*	*29*	*28*	*31*		*4*	*19*		
31 NIAGARA COUNTY	**92,036**	**108,550**	**3,143**	**1,713**	**2,610**	**333**	**94**	**604**	**97**	**15**
01 Lockport, city	**17,970**	**18,693**	**388**	**331**	**462**	**36**	**16**	**153**	**17**	**6**
02 Niagara Falls, city	**30,445**	**42,257**	**1,677**	**719**	**1,347**	**206**	**52**	**135**	**47**	**5**
03 North Tonawanda, city	**11,955**	**13,498**	**501**	**210**	**258**	**59**	**11**	**51**	**25**	**2**
50 Cambria	1,749	1,892	38	17	11	1	3	9	1	
51 Hartland	2,517	2,659	43	30	61		3	16		
20 Middleport, village (58)	*1,530*	*1,427*	*24*	*21*	*18*	*1*		*16*		
52 Lewiston	2,550	2,535	42	31	92	1	2	17	1	
21 Lewiston, village	*713*	*741*	*18*	*11*	*24*	*1*		*5*		
53 Lockport	2,399	2,077	16	83	38	4	1	46		
54 Newfane	4,060	4,537	69	50	25	6	2	31		
55 Niagara	349	336	6	1	1					
22 La Salle, village	*1,299*	*2,402*	*52*	*18*	*14*	*4*	*1*	*9*		
56 Pendleton	1,267	1,323	17	12	3	2		7		
57 Porter	2,099	1,933	37	31	73	3		15		
23 Youngstown, village	*556*	*571*	*9*	*9*	*3*	*2*		*6*	*1*	
58 Royalton (20)	3,547	3,703	69	41	69	2	2	30	1	1
59 Somerset	1,819	1,870	34	20	56	2		14		
24 Barker, village	*441*	*550*	*8*	*9*	*3*			*6*		
60 Wheatfield	1,792	1,936	45	21	14	1	1	6	1	1
61 Wilson	2,324	2,475	46	28	35	1		17	3	
25 Wilson, village	*655*	*741*	*4*	*20*	*3*	*1*		*15*		
Indian Reservation†		394								
32 ONEIDA COUNTY	**154,157**	**167,331**	**4,565**	**3,140**	**2,474**	**444**	**162**	**1355**	**127**	**18**
01 Rome, city	**20,497**	**21,926**	**778**	**676**	**813**	**76**	**38**	**255**	**14**	**3**
02 Utica, city	**74,419**	**80,589**	**2,561**	**1,577**	**553**	**259**	**85**	**593**	**79**	**11**
03 Sherrill, city			**36**	**8**	**25**	**2**		**4**		
50 Annsville	1,449	1,450	19	25	3	2		19		
51 Augusta	1,067	1,083	15	14	1	2	1	8		

* These villages do not, as yet, report separately, their deaths being included

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases reportable diseases)	Deaths	
2	....	....	....	3	....	....	....	3	....	....	....	1	....	6	24	55
128	....	1	....	....	....	....	....	13	5	1	....	4	1	3	46	24
9	....	3	....	3	....	....	....	2	....	....	....	1	....	4	17	56
11	....	....	....	....	....	....	....	1	....	....	....	1	....	11	13	25
4	....	....	....	....	....	....	....	2	2	....	1	1	2	....	27	57
66	....	....	....	....	....	....	....	2	1	....	....	....	....	....	8	26
4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	27
17	1	....	....	....	....	....	....	....	1	....	....	3	....	....	13	58
12	....	....	....	....	....	....	....	2	....	....	....	....	....	5	8	59
60	....	....	....	2	1	....	....	1	5	2	....	4	3	16	29	28
400	**13**	**122**	**1**	**106**	**7**	**165**	**18**	**97**	**79**	**15**	**14**	**85**	**68**	**739**	**1158**	**29**
44	3	31	1	28	4	19	2	25	22	5	4	24	19	107	301	50
2	....	7	....	....	....	12	....	2	1	....	....	1	....	17	11	20
4	....	1	....	11	....	2	....	....	....	....	....	....	....	24	23	21
16	....	4	....	4	....	18	1	8	5	....	....	5	2	328	68	22
39	....	2	....	....	....	2	1	5	2	....	....	1	4	68	57	23
....	....	1	....	....	....	2	....	....	....	....	....	....	....	1	13	24
3	....	2	....	....	1	6	1	11	6	2	1	5	....	39	55	25
4	....	10	....	5	....	2	....	....	....	....	....	1	1	13	12	29
21	....	11	....	4	....	16	1	7	2	....	....	1	2	38	30	30
1	....	....	....	11	....	....	....	....	....	....	....	....	....	4	8	31
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	36
112	3	31	....	41	1	37	1	17	13	5	1	18	18	78	167	51
....	....	....	....	....	....	1	1	1	11	....	3	6	5	2	156	26
2	....	....	....	....	....	2	....	1	....	....	....	1	....	8	2	32
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	33
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	34
1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	35
114	3	22	....	1	1	39	9	19	15	3	5	18	16	12	213	52
10	1	....	....	....	....	4	1	1	2	....	....	1	....	....	20	27
27	5	....	....	1	....	3	....	....	....	....	....	3	1	....	21	28
555	**7**	**92**	**2**	**377**	**11**	**132**	**6**	**174**	**95**	**10**	**23**	**94**	**113**	**1,173**	**1347**	**31**
72	**1**	**2**	....	**62**	....	**4**	**2**	**24**	**27**	**4**	**3**	**25**	**9**	**277**	**258**	**01**
236	**4**	**44**	....	**102**	**5**	**85**	**4**	**114**	**35**	**2**	**14**	**28**	**87**	**687**	**537**	**02**
5	....	**19**	....	**111**	**4**	**21**	....	**16**	**15**	**1**	**2**	**14**	**16**	**60**	**157**	**03**
7	....	....	....	....	....	....	....	2	1	1	1	1	....	....	14	50
2	1	....	....	8	1	1	....	2	2	1	2	2	....	47	22	51
1	....	1	....	2	....	2	....	1	2	....	....	1	....	11	18	20
61	....	8	1	6	....	10	....	....	....	....	....	....	....	3	30	52
4	....	....	....	14	1	2	....	....	1	....	....	....	....	4	9	21
23	1	....	....	5	....	....	....	4	3	....	....	7	....	6	72	53
....	....	5	....	5	....	1	....	2	2	....	....	....	....	12	48	54
....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	1	55
5	....	1	....	....	....	1	....	2	....	....	....	1	1	5	16	22
....	....	2	....	....	....	....	....	1	1	....	....	1	....	....	10	56
70	....	....	....	....	....	3	....	....	....	....	....	2	....	....	29	57
1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	9	23
....	....	4	....	32	....	....	....	2	1	....	....	4	....	30	35	58
29	....	....	....	12	....	1	....	1	....	....	....	1	....	13	19	59
1	....	....	....	1	....	....	....	....	1	....	....	1	....	1	7	24
....	....	2	1	10	....	....	....	1	3	....	....	....	....	....	16	60
5	....	3	....	7	....	....	....	1	1	1	1	4	....	15	22	61
....	....	1	....	....	....	1	....	....	....	....	....	2	....	1	18	25
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1237	**29**	**160**	**1**	**233**	**14**	**118**	**18**	**205**	**259**	**13**	**37**	**168**	**103**	**381**	**2493**	**32**
451	**11**	**23**	....	**7**	....	**21**	**2**	**112**	**122**	**1**	**7**	**27**	**25**	**184**	**479**	**01**
146	**6**	**66**	**1**	**71**	**12**	**56**	**10**	**26**	**90**	....	**26**	**95**	**50**	**109**	**1276**	**02**
1	....	**6**	....	**12**	....	**1**	....	....	....	....	....	....	**1**	**5**	**7**	**03**
....	2	....	....	....	....	1	....	2	1	....	....	2	....	....	20	50
....	....	....	....	....	....	1	....	....	1	....	....	....	....	....	13	51

with towns in which they are located. †Distributed by towns in U. S. Census.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (stillbirths excluded)		Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
								Under 1	1 to 4	60 years and over	Cases	Deaths
ONEIDA COUNTY—(*Concluded*)												
20 Oriskany Falls, village	*892*	*973*	*15*	...	*15*	*11*	*1*	....	*10*	*1*	...	
52 Ava	563	659	14	...	9	3	....	....	4	....	...	
53 Boonville	1,397	1,351	14	...	17	16	2	1	11	....	...	
21 Boonville, village	*1,794*	*1,909*	*22*	...	*31*	*43*	*3*	*1*	*22*	*2*	...	
54 Bridgewater	587	604	7	...	7	6	....	....	5	1	...	
22 Bridgewater, village	*245*	*258*	*1*	...	*10*	*1*	....	....	*6*	....	...	
55 Camden	1,256	1,178	24	...	18	34	2	....	15	....	...	
23 Camden, village	*2,170*	*2,181*	*31*	...	*32*	*60*	*2*	*1*	*23*	*2*	...	
56 Deerfield	1,660	1,836	12	1	5	18	1	....	2	1	...	
57 Florence	936	970	17	...	13	2	2	....	6	....	...	
58 Floyd	697	702	14	1	10	3	1	....	4	....	...	
59 Forestport	593	665	13	...	4	5	....	....	3	....	...	
24 Forestport, village	*507*	*505*	*6*	...	*8*	*55*	....	....	*6*	....	...	
60 Kirkland	3,097	3,517	70	...	38	22	6	3	19	4	1	
25 Clinton, village	*1,236*	*1,264*	*17*	...	*25*	*13*	*1*	*2*	*15*	*1*	*1*	
61 Lee	1,379	1,313	21	...	20	40	1	....	12	2	...	
62 Marcy	1,301	1,260	12	1	27	21	....	1	13	1	...	
63 Marshall	1,502	1,543	25	2	24	15	2	....	14	....	...	
26 Waterville, village (67)	*1,410*	*1,564*	*21*	...	*33*	*31*	*3*	....	*29*	*1*	...	
64 New Hartford	4,752	6,405	153	3	73	99	16	5	26	9	1	
27 New Hartford, village	*1,195*	*1,459*	*28*	...	*26*	*12*	*2*	*2*	*17*	....	...	
65 Paris	2,010	2,046	47	1	24	39	4	....	16	1	...	
28 Clayville, village	*649*	*972*	*29*	*2*	*14*	*14*	*5*	*2*	*4*	....	...	
66 Remsen	692	566	12	...	7	31	....	1	6	....	...	
29 Remsen, village (69)	*421*	*417*	*4*	...	*7*	*1*	*1*	....	*6*	....	...	
67 Sangerfield (26)	918	739	16	...	17	19	2	1	10	....	...	
68 Steuben	785	839	10	...	13	11	1	1	6	....	...	
69 Trenton (29)	1,472	1,677	31	1	24	20	3	....	12	3	...	
30 Holland Patent, village	*337*	*339*	*6*	...	*4*	....	....	....	*4*	....	...	
31 Prospect, village	*278*	*339*	*4*	...	*9*	*6*	....	....	*6*	*1*	...	
32 Trenton, village	*289*	*316*	*6*	...	*4*	*3*	....	....	*3*	....	...	
70 Vernon	2,353	2,910	22	1	24	41	2	....	15	....	...	
33 Oneida Castle, village	*393*	*399*	*7*	...	*11*	*1*	*1*	....	*7*	....	...	
34 Vernon, village	*451*	*532*	*3*	...	*4*	*44*	*1*	....	*1*	....	...	
71 Verona	3,348	3,752	35	1	43	55	4	2	29	1	...	
35 New London, village	*108*	....	....	....	....	....	....	....	....	....	....	
72 Vienna	1,735	1,931	37	1	32	12	1	1	19	1	1	
*36 Sylvan Beach, village**	*169*	....	....	....	....	....	....	....	....	....	....	
73 Western	1,355	1,150	17	...	18	18	1	2	13	....	...	
74 Westmoreland	1,995	2,115	34	1	28	18	5	....	18	....	...	
75 Whitestown	4,732	4,459	213	9	57	131	20	10	9	....	...	
37 Whitesboro, village	*2,375*	*2,493*	*40*	*1*	*34*	*59*	*5*	*1*	*18*	....	...	
38 Yorkville, village	*691*	*1,086*	*28*	...	*8*	*28*	*2*	*1*	*5*	*2*	...	
39 Oriskany, village	.....	*1,090*	*18*	*1*	*13*	*18*	....	....	*7*	....	...	
01 Rome Custodial Asylum	.....	.....	.....	...	85	93	1	5	4	....	1	
02 Utica State Hospital	.....	.....	.....	...	145	1	1	....	76	1	...	
33 ONONDAGA COUNTY	**200,298**	**213,992**	**5,613**	**201**	**3,534**	**4,011**	**545**	**164**	**1405**	**75**	**17**	
01 Syracuse, city	**137,249**	**145,293**	**4,218**	**155**	**2,438**	**2,939**	**430**	**132**	**863**	**26**	**10**	
50 Camillus	1,879	2,191	67	4	24	10	4	2	12	2	...	
20 Camillus, village	*763*	*840*	*15*	...	*13*	*9*	....	....	*7*	....	...	
51 Cicero	2,475	2,689	44	...	30	38	3	....	18	....	...	
52 Clay	2,431	2,661	47	1	25	13	1	....	16	....	...	
53 DeWitt	3,338	4,190	73	2	65	19	10	2	18	....	...	
21 East Syracuse, village	*3,274*	*3,839*	*117*	*6*	*50*	*46*	*10*	*3*	*20*	....	...	
22 Eastwood, village	*810*	*777*	*31*	...	*21*	*10*	*3*	....	*12*	....	...	
54 Elbridge	1,540	1,501	32	...	13	7	....	....	10	1	...	
23 Elbridge, village	*462*	*475*	*9*	...	*6*	*2*	....	....	*4*	....	...	
24 Jordan, village	*978*	*1,063*	*10*	...	*9*	*4*	....	....	*6*	*1*	...	
55 Fabius	1,213	1,230	20	1	29	2	5	3	15	....	...	
25 Fabius, village	*344*	*340*	*5*	...	*4*	*7*	....	....	*3*	....	...	
56 Geddes	820	853	22	...	21	6	1	....	3	....	...	
26 Solvay, village	*5,139*	*5,886*	*209*	*8*	*59*	*98*	*16*	*4*	*18*	*3*	*2*	

* Disorganized: population

District numbers, population (U. S. Census, April 25, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39-45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
4	....	....	....	....	....	*4*	....	.....	.....	.....	....	*1*	.....	*2*	*14*	*20*
2	....	....	....	....	....	....	....	1	1	.....	....	1	.....	.....	7	52
15	....	....	....	....	....	....	....	1	.....	.....	....	1	.....	.....	16	53
39	*2*	....	....	....	....	....	....	*1*	*1*	.....	....	*1*	*1*	*1*	*26*	*21*
1	....	....	....	3	....	....	....	.....	.....	.....	....	....	.....	1	7	54
1	....	....	....	....	....	....	....	.....	*1*	.....	....	.....	.....	.....	*9*	*22*
34	1	....	....	....	....	....	....	.....	.....	.....	....	2	.....	.....	15	55
55	....	*2*	....	....	....	....	....	.....	*2*	*1*	....	*2*	.....	.....	*28*	*23*
17	2	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	3	56
2	1	....	....	....	....	....	....	.....	1	.....	....	.....	.....	.....	11	57
1	....	....	....	....	....	1	....	1	1	.....	....	.....	.....	.....	9	58
3	....	1	....	....	....	....	....	1	.....	.....	....	.....	.....	.....	4	59
50	....	....	....	....	....	....	....	.....	*1*	2	....	.....	.....	*3*	*7*	*24*
4	....	5	....	6	....	....	....	3	3	.....	....	.....	3	.....	31	60
1	....	*2*	....	*4*	....	*1*	....	*2*	*1*	*2*	*1*	*2*	.....	.....	*20*	*25*
38	1	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	19	61
13	....	1	....	2	....	3	1	1	3	.....	....	3	.....	.....	20	62
5	....	1	....	2	....	....	....	3	2	.....	....	.....	.....	4	22	63
2	....	*1*	....	*19*	....	....	....	*1*	.....	.....	....	*2*	.....	7	*31*	*26*
58	....	10	....	.....	....	3	1	15	7	.....	....	5	5	4	54	64
....	....	*1*	....	.....	....	*5*	....	*2*	*1*	.....	....	.....	*1*	*4*	*24*	*27*
9	....	....	....	27	....	2	....	.....	2	.....	....	5	1	.....	16	65
....	....	....	....	*10*	*2*	....	....	*1*	.....	.....	....	*2*	*3*	*3*	*7*	*28*
30	....	....	....	....	....	....	....	1	.....	.....	....	.....	.....	.....	7	66
....	....	....	....	....	....	....	....	*1*	.....	.....	....	*2*	.....	.....	*5*	*29*
2	....	2	....	....	....	1	....	1	.....	.....	....	.....	2	13	15	67
11	....	....	....	....	....	....	....	.....	1	.....	....	1	.....	.....	11	68
12	1	....	....	3	....	....	....	1	4	1	....	1	.....	.....	18	69
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	4	*30*
2	....	....	....	....	....	....	....	*1*	.....	*1*	....	.....	.....	*1*	*9*	*31*
1	....	....	....	....	....	....	....	*2*	.....	.....	....	*1*	.....	.....	*3*	*32*
1	....	1	....	30	....	1	....	.....	.....	.....	....	2	2	8	20	70
....	....	....	....	*1*	....	....	....	.....	*1*	.....	....	*2*	.....	.....	*8*	*33*
4	....	....	....	*22*	....	....	....	.....	.....	.....	....	*1*	.....	*18*	*3*	*34*
32	....	15	....	4	....	1	....	.....	1	.....	....	2	.....	2	40	71
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	.....	*35*
....	....	4	....	1	....	5	1	1	.....	.....	....	1	.....	.....	29	72
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	.....	*36*
17	....	1	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	18	73
8	....	....	....	4	....	2	....	2	1	.....	....	1	1	2	25	74
98	2	4	....	....	....	6	3	16	5	1	2	1	7	6	37	75
48	....	*5*	....	*4*	....	*1*	....	*1*	*3*	.....	*1*	*1*	*1*	.....	*28*	*37*
14	....	*2*	....	*1*	....	*1*	....	*5*	.....	*3*	....	.....	.....	.....	*8*	*38*
5	....	*7*	....	....	....	*1*	....	.....	*2*	*1*	....	*1*	.....	*4*	*10*	*39*
....	6	....	....	....	....	....	....	52	37	.....	....	1	.....	41	30	01
....	....	....	....	....	....	....	....	.....	16	.....	....	4	.....	1	25	02
1911	**22**	**1057**	**14**	**44**	**11**	**497**	**43**	**308**	**283**	**7**	**53**	**234**	**156**	**112**	**2701**	**33**
1468	**15**	**747**	**11**	**19**	**10**	**427**	**32**	**237**	**141**	.....	**45**	**165**	**129**	**15**	**1880**	**01**
4	....	2	....	....	....	1	....	.....	.....	1	1	....	2	.....	21	50
3	....	*3*	....	....	....	*3*	....	.....	.....	.....	.....	*2*	.....	.....	*11*	*20*
9	....	27	....	....	....	1	....	1	1	.....	....	6	1	.....	22	51
3	....	5	....	....	....	....	....	1	.....	.....	....	1	.....	4	24	52
7	....	1	....	1	1	3	1	7	5	.....	1	2	5	.....	50	53
19	....	*14*	....	....	....	*5*	*2*	*6*	*1*	.....	*1*	*1*	.....	*2*	*45*	*21*
1	....	*1*	....	....	....	*8*	....	.....	*2*	.....	....	.....	*2*	.....	*17*	*22*
2	....	3	....	....	....	....	....	1	1	.....	....	3	.....	.....	9	54
....	....	*2*	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	*6*	*23*
1	....	*2*	....	....	....	....	....	.....	.....	.....	....	*3*	.....	.....	*6*	*24*
....	....	2	....	....	....	....	1	.....	1	.....	....	2	.....	.....	25	55
....	....	*7*	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	*4*	*25*
3	1	....	1	....	....	2	1	1	2	.....	....	1	.....	.....	15	56
29	....	*42*	....	....	....	*4*	....	*5*	*1*	.....	....	*5*	*8*	*15*	*43*	*26*

included in town for 1915.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (stillbirths excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
ONONDAGA COUNTY—(*Concluded*)											
57 LaFayette	1,601	1,447	27	2	24	31	2	1	16	....	...
58 Lysander	2,644	2,746	43	1	36	83	6	2	21	3	1
27 Baldwinsville, village (68)	*3,099*	*3,220*	*56*	*1*	*44*	*68*	*4*	....	*26*	....	...
59 Manlius	3,221	2,550	56	1	47	83	5	1	30	....	...
28 Fayetteville, village	*1,481*	*1,779*	*24*	*2*	*28*	*42*	*3*	....	*21*	....	...
34 Minoa, village	.....	*668*	*28*	*1*	*7*	*4*	*2*	*1*	*2*	*1*	...
29 Manlius, village	*1,314*	*1,304*	*33*	...	*16*	*31*	*2*	*2*	*6*	*1*	...
60 Marcellus	1,909	1,936	34	...	28	19	3	1	16	....	...
30 Marcellus, village	*917*	*991*	*11*	...	*12*	*20*	*1*	....	*9*	....	...
61 Onondaga	6,340	6,267	123	6	292	73	16	1	130	2	1
62 Otisco	1,066	1,058	21	...	15	12	3	....	9	....	...
63 Pompey	2,093	2,344	42	4	23	57	1	3	11	6	...
64 Salina	1,820	2,367	44	...	29	39	3	4	5	5	...
31 Liverpool, village	*1,388*	*1,591*	*20*	...	*13*	*56*	*2*	....	*6*	....	...
65 Skaneateles	2,659	2,851	39	3	25	41	3	....	11	22	3
32 Skaneateles, village	*1,615*	*1,768*	*24*	*1*	*30*	*12*	....	*1*	*23*	*1*	...
66 Spafford	1,064	1,082	15	...	11	21	2	....	9	....	...
67 Tully	835	1,015	22	1	9	48	1	1	4	....	...
33 Tully, village	*551*	*559*	*6*	...	*9*	*20*	*1*	....	*5*	....	...
68 Van Buren (27)	1,966	2,034	26	1	29	41	2	....	20	1	...
Indian Reservation*	.....	587	.....	.....	.....	.....	.....	.....	.....	.....	.....
01 Syracuse Institution for Feeble-minded	.....	.....	.....	...	10	.....	.....	.....	1	....	...
34 ONTARIO COUNTY	52,286	54,628	**1,138**	**38**	**876**	**511**	**81**	**31**	**488**	**49**	**4**
01 Canandaigua, city	7,217	7,501	**199**	**8**	**162**	**51**	**7**	**4**	**93**	**2**	**1**
02 Geneva, city	12,446	13,232	**379**	**15**	**237**	**91**	**34**	**14**	**97**	**28**	**2**
50 Bristol	1,247	1,143	23	...	19	7	6	....	8	2	1
51 Canadice	559	556	6	1	4	7	....	....	4	....	...
52 Canandaigua	2,188	2,140	19	...	19	18	....	....	16	1	...
53 East Bloomfield	1,892	1,975	25	...	41	27	....	1	20	....	...
54 Farmington	1,568	1,585	35	...	13	43	2	....	7	1	...
55 Geneva	1,086	1,386	29	1	14	7	....	2	6	1	...
56 Gorham	2,010	1,986	25	...	14	3	2	1	10	....	...
(20) Rushville, village ....(pt.	*124*	*128)*	*2*	...	.....	.....	.....	.....	.....	*1*	...
[*20† Rushville, village (6156)*	*463*	*459]*	*4*	...	*7*	*2*	.....	.....	*7*	....	...
57 Hopewell	1,493	1,416	20	...	40	3	1	....	28	....	...
58 Manchester	1,707	1,828	39	2	24	1	4	2	15	1	...
21 Clifton Springs, village (60)	*1,600*	*1,664*	*25*	...	*59*	*16*	*1*	....	*35*	....	...
22 Manchester, village	*881*	*1,115*	*43*	...	*14*	*7*	*3*	*1*	*5*	*2*	...
23 Shortsville, village	*1,112*	*1,228*	*16*	*3*	*15*	*25*	*1*	*1*	*9*	....	...
59 Naples	1,256	1,147	18	...	14	12	3	1	8	1	...
24 Naples, village	*1,093*	*1,138*	*13*	*1*	*27*	*10*	*1*	....	*23*	*4*	...
60 Phelps (21)	2,968	3,092	48	2	36	31	2	1	29	....	...
25 Phelps, village	*1,354*	*1,375*	*15*	*1*	*26*	*27*	*1*	....	*17*	*1*	...
61 Richmond	1,277	1,208	19	1	18	9	3	....	11	1	...
62 Seneca	2,669	3,001	47	2	30	24	3	1	22	3	...
63 South Bristol	965	964	17	...	10	2	....	....	7	....	...
64 Victor	1,512	1,563	29	1	18	46	3	1	7	....	...
26 Victor, village	*881*	*1,054*	*23*	...	*13*	*39*	*3*	....	*8*	....	...
65 West Bloomfield	1,181	1,203	24	...	9	4	1	1	5	....	...
35 ORANGE COUNTY	116,001	**118,118**	**2,273**	**79**	**2,100**	**2,523**	**233**	**71**	**949**	**32**	**6**
01 Middletown, city	15,313	**16,381**	**282**	**11**	**442**	**219**	**25**	**9**	**201**	**1**	**1**
02 Newburgh, city	27,805	**27,876**	**576**	**23**	**539**	**967**	**54**	**17**	**228**	**5**	...
03 Port Jervis, city	9,564	**9,413**	**218**	**7**	**193**	**268**	**27**	**7**	**77**	**2**	...
50 Blooming Grove	1,479	1,481	32	...	14	2	1	....	7	....	...
20 Washingtonville, village	*631*	*635*	*15*	...	*7*	*2*	.....	.....	*7*	*1*	*1*
51 Chester	851	855	19	...	14	34	1	1	9	....	...
21 Chester, village	*1,210*	*1,280*	*13*	...	*10*	*49*	*3*	*1*	*4*	*2*	...
52 Cornwall	3,032	2,870	43	2	35	60	7	1	20	1	...
22 Cornwall, village	*2,658*	*2,240*	*27*	*1*	*28*	*32*	*2*	*1*	*18*	....	...

* Distributed by towns in U. S. census. † Village of Rushville, located

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
8	1	4	....	.....	.....	3	2	5	1	.....	.....	3	.....	11	17	57
76	2	2	.....	.....	.....	2	.....	.....	1	.....	.....	3	.....	.....	29	58
36	....	*22*	.....	.....	.....	*13*	....	*1*	*1*	*1*	*1*	*1*	.....	*1*	*41*	*27*
10	....	57	....	7	....	1	....	5	2	2	....	4	.....	1	41	59
15	....	*16*	....	*11*	.....	.....	.....	.....	*1*	*1*	*1*	....	*1*	*1*	*25*	*28*
....	....	*3*	.....	.....	.....	.....	.....	.....	.....	.....	.....	*1*	*1*	.....	*5*	*34*
2	....	*23*	*1*	.....	.....	*1*	....	*3*	*1*	.....	.....	*1*	.....	*1*	*13*	*29*
5	....	9	....	.....	.....	2	1	2	2	.....	.....	5	2	1	18	60
7	....	*3*	.....	.....	.....	.....	.....	*2*	*1*	.....	.....	*1*	.....	*8*	*10*	*30*
14	....	32	1	.....	.....	7	1	17	110	.....	2	10	3	1	164	61
1	....	1	....	2	....	5	....	1	.....	.....	.....	2	.....	2	13	62
35	....	8	....	4	....	1	1	3	2	.....	.....	3	.....	.....	17	63
13	2	7	.....	.....	.....	2	1	1	.....	.....	.....	1	.....	11	25	64
28	.....	.....	.....	.....	.....	*2*	....	*1*	.....	.....	.....	.....	.....	*25*	*13*	*31*
6	....	3	.....	.....	.....	2	....	2	2	1	....	2	.....	5	18	65
4	....	*3*	.....	.....	.....	*1*	....	*1*	*1*	*1*	*1*	....	.....	*1*	*28*	*32*
14	....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	11	66
46	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	1	7	67
18	.....	.....	.....	.....	.....	.....	.....	*1*	.....	.....	.....	*1*	*1*	*1*	*7*	*33*
32	....	4	.....	.....	.....	1	....	3	3	.....	.....	4	1	.....	21	68
....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
....	....	.....	.....	.....	.....	.....	.....	.....	5	.....	.....	.....	.....	.....	5	01
80	....	**60**	**1**	**81**	**1**	**13**	**1**	**60**	**40**	**7**	**8**	**63**	**11**	**161**	**747**	**34**
3	....	**16**	.....	.....	.....	**2**	....	**8**	**7**	.....	.....	**10**	.....	**20**	**144**	**01**
11	....	**7**	**1**	**5**	....	**2**	....	**20**	**4**	.....	**5**	**17**	**7**	**18**	**201**	**02**
....	....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	16	50
....	....	.....	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	4	51
2	....	2	.....	.....	.....	1	....	3	.....	.....	.....	1	.....	9	18	52
6	....	14	.....	.....	.....	3	....	1	14	.....	1	6	.....	3	20	53
21	....	3	....	8	....	1	....	1	2	1	.....	.....	.....	7	11	54
1	....	.....	.....	2	.....	.....	.....	3	3	.....	.....	.....	.....	.....	11	55
....	....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	1	.....	1	13	56
....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*20*
....	....	.....	.....	*1*	.....	.....	.....	.....	.....	.....	.....	.....	.....	*1*	*7*	*20*
....	....	1	....	2	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	38	57
....	....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	4	1	.....	18	58
3	....	.....	.....	*1*	.....	.....	.....	*5*	*2*	*2*	....	*4*	.....	*5*	*53*	*21*
....	....	.....	.....	.....	.....	.....	.....	*1*	.....	.....	.....	.....	1	*4*	*13*	*22*
4	....	.....	.....	*5*	....	*2*	*1*	*3*	*1*	.....	.....	*2*	.....	*11*	*11*	*23*
4	....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	2	.....	6	12	59
1	....	.....	.....	*1*	.....	.....	.....	*1*	*1*	*1*	....	*3*	.....	*2*	*23*	24
....	....	1	....	4	.....	.....	.....	3	1	1	....	2	1	22	32	60
....	....	1	.....	.....	.....	.....	.....	*2*	*2*	*1*	.....	.....	.....	*22*	*24*	25
....	....	1	.....	.....	.....	.....	.....	2	1	.....	.....	.....	.....	5	17	61
1	....	1	....	5	....	1	....	1	1	.....	.....	3	.....	12	26	62
....	....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	.....	1	8	63
10	....	3	....	22	.....	.....	.....	2	.....	.....	1	1	.....	9	16	64
15	....	*3*	....	*20*	....	*1*	....	.....	*1*	.....	.....	*2*	*1*	*2*	*9*	*26*
....	....	2	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	9	65
1311	**5**	**140**	**2**	**156**	**6**	**167**	**14**	**196**	**196**	**15**	**22**	**113**	**53**	**506**	**1683**	**35**
05	**2**	**10**	....	**8**	**1**	**22**	**2**	**22**	**42**	**2**	**6**	**26**	**3**	**5**	**359**	**01**
681	**3**	**19**	.....	.....	.....	**50**	**8**	**59**	**85**	.....	**6**	**35**	**12**	**150**	**390**	**02**
11	....	**20**	....	**27**	**1**	**3**	....	**15**	**7**	**4**	....	**12**	**9**	**186**	**164**	**03**
....	....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	2	.....	.....	12	50
1	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*1*	.....	.....	*5*	*20*
17	....	2	....	12	.....	.....	.....	1	1	.....	.....	.....	.....	2	13	51
26	....	*2*	....	*1*	*2*	*3*	....	*2*	.....	*1*	....	*1*	*1*	*13*	*6*	*21*
2	....	2	.....	.....	.....	5	....	.....	1	.....	.....	3	.....	50	31	52
11	....	.....	.....	.....	.....	.....	.....	*1*	*3*	.....	.....	*2*	*1*	*20*	*22*	*22*

in two counties, Ontario and Yates. Total for entire village in bracketed line.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census April 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
ORANGE COUNTY—*(Concluded)*											
53 Crawford	1,659	1,693	14	2	37	20	....	....	28	....	...
54 Deerpark	1,696	1,753	16	2	25	24	....	....	14	....	...
55 Goshen	2,068	1,799	50	3	80	43	11	3	36	1	...
23 Goshen, village	*3,081*	*3,511*	*60*	*2*	*50*	*32*	*6*	*1*	*25*	....	...
56 Greenville	644	836	7	...	9	1	2	....	6	....	...
57 Hamptonburg	1,168	1,184	25	1	14	77	3	....	5	1	...
58 Highlands	3,663	1,536	35	...	24	13	2	4	5	....	...
24 Highland Falls, village	*2,470*	*2,518*	*63*	...	*50*	*52*	*5*	*7*	*19*	*3*	...
59 Minisink	953	1,018	20	1	14	4	3	1	3	....	...
25 Unionville, village	*351*	*387*	*4*	...	*3*	*6*	....	....	*2*	....	...
60 Monroe	1,090	515	8	...	12	3	1	....	8	....	...
26 Monroe, village	*1,195*	*1,519*	*37*	...	*18*	.....	*1*	....	*11*	....	...
30 Harriman, village	.....	*854*	*14*	...	*13*	*10*	*2*	*3*	*2*	....	...
61 Montgomery	2,494	1,864	62	2	33	28	2	....	20	1	...
27 Montgomery, village	*941*	*957*	*14*	...	*16*	*29*	....	*1*	*9*	....	...
28 Walden, village	*4,004*	*5,196*	*86*	*1*	*53*	*57*	*6*	*3*	*22*	*1*	...
62 Mt. Hope	1,786	1,589	22	2	40	135	3	....	16	....	...
63 Newburgh	5,132	4,807	92	...	65	37	10	2	39	1	...
64 New Windsor	2,667	2,745	74	3	36	22	6	3	17	....	...
65 Tuxedo	2,858	3,636	69	3	32	22	5	2	9	2	1
26 Wallkill	2,578	2,803	36	1	31	56	2	....	19	1	...
67 Warwick	4,823	5,608	106	4	67	91	17	2	25	3	1
69 Warwick, village	*2,318*	*2,505*	*55*	*4*	*38*	*104*	*11*	*1*	*17*	*2*	*1*
68 Wawayanda	1,603	1,954	34	3	35	17	10	1	14	....	...
69 Woodbury	2,216	2,300	45	1	23	7	5	....	7	3	1
01 Middletown State Hospital.	.....	.....	.....	...	158	44	....	....	74	1	...
36 ORLEANS COUNTY	32,000	**33,919**	**588**	**25**	**421**	**341**	**36**	**11**	**251**	**15**	**1**
50 Albion	1,554	1,393	22	4	31	1	....	....	21	1	...
20 Albion, village (54)	*5,016*	*5,988*	*114*	*2*	*91*	*30*	*7*	*3*	*51*	....	...
51 Barre	1,812	1,875	28	...	20	.....	3	....	12	....	...
52 Carlton	2,259	2,289	36	...	26	32	2	....	13	....	...
53 Clarendon	1,335	1,373	22	1	11	15	....	....	6	....	...
54 Gaines (20)	1,831	1,853	33	...	22	3	4	....	15	....	...
55 Kendall	1,585	1,678	28	1	18	30	1	....	14	....	...
56 Murray	2,290	2,441	51	3	18	42	3	....	10	4	...
21 Holley, village	*1,679*	*1,780*	*28*	...	*27*	*38*	*3*	*2*	*16*	*3*	...
57 Ridgeway	2,797	2,881	40	4	31	21	2	....	20	3	1
22 Medina, village (58)	*5,683*	*6,079*	*130*	*5*	*83*	*47*	*9*	*5*	*41*	*2*	...
58 Shelby (22)	2,003	2,001	17	1	15	13	....	1	12	....	...
59 Yates	1,509	1,456	29	3	12	38	2	....	6	2	...
23 Lyndonville, village	*647*	*832*	*10*	*1*	*16*	*31*	....	....	*14*	....	...
37 OSWEGO COUNTY	71,664	**75,929**	**1,500**	**53**	**1,162**	**1,061**	**132**	**42**	**653**	**29**	**1**
01 Fulton, city	10,480	**11,138**	**308**	**11**	**161**	**451**	**27**	**6**	**72**	**2**	...
02 Oswego, city	23,368	**25,426**	**553**	**25**	**367**	**84**	**49**	**14**	**175**	**12**	**1**
50 Albion	1,109	1,120	19	...	19	51	3	....	13	2	...
20 Altmar, village	*363*	*390*	*5*	...	*13*	*22*	*2*	....	*10*	....	...
51 Amboy	736	670	14	1	10	3	1	....	8	....	...
52 Boylston	667	578	17	1	10	3	3	....	4	....	...
53 Constantia	1,336	1,463	21	...	21	6	1	....	13	....	...
21 Cleveland, village	*687*	*660*	*2*	*1*	*11*	*3*	*1*	....	*6*	....	...
54 Granby	2,022	1,928	40	1	20	29	2	2	10	2	...
55 Hannibal	1,818	1,902	34	...	17	7	....	1	14	....	...
22 Hannibal, village	*330*	*432*	*3*	...	*6*	.....	.....	.....	*4*	....	...
56 Hastings	1,886	1,880	30	...	22	15	2	2	16	1	...
23 Central Square, village	*429*	*481*	*5*	...	*8*	*13*	.....	.....	*3*	....	...
57 Mexico	1,749	1,675	28	1	53	45	2	2	37	....	...
24 *Mexico, village*	*1,233*	*1,474*	*14*	...	*33*	*58*	*1*	*2*	*24*	*1*	...
58 New Haven	1,461	1,476	26	1	23	30	1	1	13	1	...
59 Orwell	929	924	14	...	28	6	2	2	12	1	...
60 Oswego	2,671	3,090	43	2	41	13	6	2	19	1	...

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–32		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
9	....	....	....	4	....	....	....	5	4	.....	....	2	.....	2	31	53
8	....	4	....	....	....	2	....	2	4	.....	....	.....	.....	8	21	54
37	....	....	....	....	....	1	....	4	1	.....	2	1	3	.....	73	55
32	....	....	....	....	....	....	....	.....	*1*	.....	*2*	*1*	*1*	.....	*45*	*23*
1	....	....	....	....	....	....	....	.....	.....	.....	....	2	.....	.....	7	56
70	....	1	....	1	....	....	....	.....	.....	.....	....	1	.....	4	13	57
2	....	2	....	....	....	3	....	1	1	.....	....	1	1	5	21	58
2	....	*2*	....	*1*	....	*34*	*1*	*4*	*7*	.....	....	*2*	*5*	*6*	*35*	*24*
2	....	1	....	....	....	....	....	1	1	.....	....	.....	.....	.....	13	59
....	....	*6*	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	*3*	*25*
....	....	....	....	....	....	1	....	1	2	.....	....	.....	1	1	9	60
....	....	....	....	....	....	....	....	.....	.....	.....	....	*1*	*1*	.....	*16*	*26*
....	....	....	....	*7*	*1*	*2*	*1*	.....	.....	.....	....	*1*	*1*	*1*	*9*	*30*
9	....	1	....	....	....	1	1	1	1	.....	....	.....	.....	15	31	61
37	....	....	....	....	....	....	....	*1*	*1*	.....	....	.....	.....	*1*	*15*	*27*
10	....	*24*	*1*	*1*	....	*2*	....	*6*	*4*	.....	....	*3*	*2*	*13*	*43*	*28*
21	....	....	....	82	....	15	....	11	15	1	....	2	.....	5	23	62
15	....	1	....	....	....	5	....	8	4	.....	1	2	1	7	57	63
8	....	1	....	....	....	6	....	4	3	1	1	3	1	2	28	64
15	....	1	....	....	....	2	1	.....	1	.....	....	4	.....	2	25	65
48	....	1	....	....	....	2	....	4	2	.....	....	1	.....	.....	28	66
39	....	23	1	7	1	7	....	9	1	2	1	....	5	1	57	67
75	....	*17*	....	*4*	....	....	....	*2*	*1*	.....	....	*3*	.....	*4*	*33*	*29*
12	....	....	....	....	....	1	....	1	1	.....	1	2	4	3	27	68
3	....	....	....	....	....	....	....	1	2	.....	1	....	1	.....	18	69
9	....	....	....	....	....	....	....	29	26	5	3	4	.....	.....	125	01
179	**1**	**64**	....	**1**	**1**	**8**	**1**	**29**	**22**	**3**	**5**	**36**	**6**	**42**	**348**	**36**
....	....	....	....	....	....	....	....	.....	2	.....	....	3	.....	.....	26	50
2	....	*6*	....	....	....	*1*	....	*8*	*5*	*1*	*2*	*8*	*4*	*12*	72	*20*
....	....	....	....	....	....	....	....	.....	1	.....	....	.....	.....	.....	19	51
26	....	....	....	....	....	....	....	.....	1	.....	1	2	.....	6	22	52
11	....	1	....	....	....	....	....	3	2	.....	....	2	.....	.....	7	53
1	....	2	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	21	54
15	....	2	....	....	....	....	....	2	.....	.....	....	.....	.....	11	18	55
27	....	4	....	....	....	....	....	7	2	.....	....	.....	.....	.....	16	56
20	*1*	*9*	....	....	....	....	....	*4*	*1*	.....	*1*	*1*	.....	*2*	*23*	*21*
11	....	4	....	1	1	....	....	.....	3	1	....	2	1	1	23	57
1	....	*28*	....	....	....	*7*	*1*	*3*	*4*	.....	....	*11*	*1*	*6*	*66*	*22*
....	....	8	....	....	....	....	....	2	1	1	....	1	.....	2	13	58
35	....	....	....	....	....	....	....	.....	.....	.....	....	1	.....	1	11	59
30	....	....	....	....	....	....	....	.....	.....	.....	*1*	*4*	.....	*1*	*11*	*23*
502	**2**	**127**	....	**135**	**9**	**62**	**7**	**87**	**67**	**2**	**5**	**99**	**33**	**117**	**939**	**37**
317	....	**47**	....	**8**	....	**43**	**4**	**21**	**4**	**1**	....	**22**	**6**	**12**	**125**	**01**
16	**1**	**16**	....	**6**	**1**	**6**	**2**	**24**	**25**	.....	**3**	**30**	**17**	**4**	**287**	**02**
30	....	2	....	16	....	....	....	1	2	.....	....	2	.....	.....	15	50
14	....	*2*	....	*5*	....	....	....	.....	.....	.....	....	*1*	*2*	*1*	*10*	*20*
1	....	....	....	....	....	....	....	2	.....	.....	....	1	.....	.....	9	51
1	....	....	....	....	....	....	....	1	1	.....	....	.....	.....	1	9	52
....	....	2	....	4	1	....	....	.....	1	.....	....	1	.....	.....	18	53
....	....	....	....	*3*	*1*	....	....	.....	.....	.....	....	*3*	.....	.....	*7*	*21*
15	*1*	*2*	....	5	1	2	....	3	1	.....	....	1	.....	.....	16	54
2	....	....	....	3	....	2	....	.....	.....	.....	....	.....	.....	.....	17	55
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	*6*	*23*
10	....	....	....	....	....	....	....	1	.....	.....	....	.....	.....	3	22	56
11	....	....	....	....	....	....	....	.....	*1*	.....	....	*3*	.....	*2*	*4*	*23*
9	....	8	....	12	....	1	....	4	1	.....	....	5	1	11	46	57
4	....	*13*	....	*14*	*1*	....	....	*1*	.....	.....	*1*	*5*	*1*	*25*	*25*	*24*
....	....	12	....	15	....	....	....	2	1	.....	....	1	.....	.....	21	58
1	....	....	....	4	....	....	....	.....	12	.....	....	1	2	.....	13	59
....	....	....	....	2	....	....	....	6	7	.....	....	1	.....	4	33	60

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
OSWEGO COUNTY—(*Concluded*)											
61 Palermo	1,255	1,281	14	...	19	26	1	....	14	....	...
62 Parish	821	871	20	...	7	6	1	....	6	1	...
25 Parish, village	*490*	*521*	*8*	...	*12*	*8*	*1*	*1*	*9*	*1*	...
63 Redfield	803	678	12	...	8	4	1	....	6	1	...
64 Richland	2,003	2,060	33	2	29	31	4	....	21	....	...
26 Pulaski, village	*1,788*	*1,860*	*21*	*3*	*31*	*34*	*3*	*1*	*20*	....	...
65 Sandy Creek	1,046	1,181	26	...	17	10	....	....	15	....	...
27 Lacona, village	*443*	*476*	*9*	...	*7*	*3*	*1*	....	*3*	....	...
28 Sandy Creek, village	*617*	*669*	*4*	...	*11*	*3*	....	*1*	*10*	....	...
66 Schroeppel	1,065	1,494	22	1	14	3	2	....	6	....	...
29 Phoenix, village	*1,642*	*1,655*	*23*	*2*	*22*	*3*	....	....	*18*	....	...
67 Scriba	2,199	2,260	35	...	32	7	2	2	19	1	...
68 Volney	2,407	2,420	48	...	48	22	7	1	29	1	...
69 West Monroe	915	935	8	...	12	9	2	1	6	1	...
70 Williamstown	896	861	17	...	18	32	3	....	13	....	...
71 Minetto	.....	.....	24	1	12	21	1	1	5	....	...
38 OTSEGO COUNTY	**47,216**	**48,534**	**800**	**33**	**780**	**882**	**64**	**9**	**487**	**28**	**4**
01 Oneonta, city	**9,491**	**10,474**	**254**	**12**	**181**	**52**	**24**	**1**	**84**	**4**	**1**
50 Burlington	1,108	1,145	21	1	17	24	....	1	12	....	...
51 Butternuts	998	1,088	14	...	18	7	1	....	10	....	...
20 Gilbertsville, village	*455*	*451*	*2*	...	*4*	....	....	*1*	*2*	....	...
52 Cherry Valley	914	782	12	1	8	11	1	....	7	1	...
21 Cherry Valley, village	*792*	*762*	*6*	...	*25*	*21*	*2*	....	*20*	....	...
53 Decatur	476	437	9	1	3	15	....	....	2	....	...
54 Edmeston	1,567	1,682	23	...	27	13	1	....	19	....	...
55 Exeter	1,067	967	7	...	18	21	....	....	12	....	...
56 Hartwick	1,813	1,943	29	2	23	121	3	....	17	2	...
57 Laurens	1,211	1,046	14	...	15	19	2	....	11	....	...
22 Laurens, village	*242*	*364*	*3*	...	*5*	*21*	....	....	*5*	....	...
58 Maryland	1,276	1,194	20	1	15	25	1	1	10	....	...
23 Schenevus, village	*576*	*537*	*13*	...	*9*	*14*	*1*	....	*6*	....	...
59 Middlefield	1,901	1,671	25	1	58	6	1	1	40	3	1
24 Cooperstown, village	*2,484*	*2,634*	*55*	*4*	*54*	*89*	*5*	*1*	*36*	*2*	*1*
60 Milford	1,314	1,283	19	1	24	16	....	1	17	....	...
25 Miljord, village	*511*	*560*	*8*	...	*5*	*9*	*1*	*1*	*2*	....	...
61 Morris	899	901	11	3	13	.....	1	....	11	....	...
26 Morris, village	*535*	*466*	*6*	...	*9*	.....	....	*1*	*7*	....	...
62 New Lisbon	1,039	976	17	1	9	3	....	....	7	....	...
63 Oneonta	1,307	1,527	19	1	16	26	....	....	10	3	...
64 Otego	1,023	942	11	...	6	11	....	....	3	1	...
27 Otego, village	*676*	*579*	*7*	*1*	*11*	*12*	....	....	*10*	*5*	...
65 Otsego	1,851	1,847	21	...	28	4	1	....	19	....	...
66 Pittsfield	917	965	13	1	15	43	2	....	8	....	...
67 Plainfield	844	873	23	...	17	8	2	....	13	1	...
68 Richfield	709	796	10	1	14	18	1	....	12	....	...
28 Richfield Springs, village	*1,503*	*1,623*	*11*	...	*26*	*6*	....	....	*17*	....	...
69 Roseboom	885	867	18	1	14	4	....	....	11	....	...
70 Springfield	1,468	1,506	17	...	19	103	2	....	10	....	...
71 Unadilla	1,367	1,332	26	...	13	5	5	....	5	....	...
29 Unadilla, village	*1,009*	*1,125*	*9*	...	*15*	*6*	*1*	....	*6*	*1*	...
72 Westford	803	773	8	...	9	15	1	....	5	3	...
73 Worcester	2,185	2,416	39	...	37	134	5	....	21	2	1
39 PUTNAM COUNTY	**14,665**	**12,767**	**210**	**3**	**164**	**366**	**25**	**6**	**87**	**2**	...
50 Carmel	2,610	2,737	49	2	39	44	7	....	21	....	...
51 Kent	968	854	23	...	20	7	4	1	10	1	...
52 Patterson	1,536	1,451	11	1	14	10	....	1	9	....	...
53 Phillipstown	2,031	1,657	19	...	23	82	2	1	11	....	...
20 Cold Spring, village	*2,549*	*935*	*25*	...	*25*	*145*	*5*	*2*	*11*	....	...
21 Nelsonville, village	*765*	*979*	*8*	...	*9*	*21*	....	....	*5*	....	...
54 Putnam Valley	924	992	8	...	8	27	2	....	6	1	...
55 Southeast	1,986	1,760	36	...	15	5	3	....	8	....	...
22 Brewster, village	*1,296*	*1,402*	*31*	...	*11*	*25*	*2*	*1*	*6*	....	...

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
22	....	2	....	....	....	1	....	1	1	.....	....	....	.....	.....	18	61
4	....	....	....	1	....	....	....	.....	.....	.....	....	.....	.....	.....	7	62
2	....	*2*	....	*1*	....	....	....	*2*	*1*	.....	....	*2*	*1*	.....	*8*	*25*
....	....	....	....	....	....	....	....	1	.....	.....	....	1	.....	2	7	63
3	....	....	....	23	2	1	....	2	.....	.....	....	3	2	2	22	64
....	....	*6*	....	*3*	*2*	*2*	....	*2*	*2*	.....	....	*3*	.....	*21*	*24*	*26*
....	....	....	....	8	....	....	....	2	.....	.....	....	1	.....	.....	16	65
....	....	*1*	....	....	....	....	....	*2*	.....	.....	....	....	.....	.....	*7*	*27*
....	....	*1*	....	....	....	....	....	.....	.....	.....	....	*1*	*1*	*2*	*9*	*28*
....	....	....	....	....	....	....	....	2	2	1	....	3	.....	.....	9	66
....	....	....	....	....	....	....	....	*3*	*3*	.....	....	*4*	.....	.....	*15*	*29*
1	....	1	....	....	....	....	....	1	.....	.....	....	3	.....	3	29	67
12	....	6	....	2	....	....	....	1	1	.....	....	1	.....	.....	46	68
2	....	....	....	....	....	4	1	2	.....	.....	1	....	.....	.....	10	69
23	....	4	....	....	....	....	....	.....	1	.....	....	....	.....	5	17	70
2	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	19	12	71
317	**1**	**37**	....	**232**	**3**	**20**	....	**18**	**20**	**5**	**6**	**59**	**9**	**225**	**678**	**38**
7	**1**	**7**	....	**9**	**1**	**7**	....	**3**	**6**	**2**	**2**	**14**	**4**	**13**	**152**	**01**
14	....	9	....	....	....	....	....	1	.....	.....	....	3	.....	.....	14	50
2	....	1	....	....	....	....	....	.....	.....	.....	....	1	.....	4	17	51
....	....	....	....	....	....	....	....	.....	.....	.....	....	....	.....	.....	*4*	*20*
3	....	....	....	3	....	....	....	.....	.....	.....	1	....	.....	**4**	7	52
....	....	*1*	....	*12*	....	....	....	*1*	.....	.....	*1*	....	*1*	*7*	*23*	*21*
14	....	....	....	1	....	....	....	.....	.....	.....	....	1	.....	.....	2	53
5	....	....	....	6	....	....	....	.....	.....	.....	....	2	.....	2	25	54
16	....	....	....	....	....	5	....	.....	.....	.....	....	5	.....	.....	13	55
10	....	1	....	50	....	....	....	2	1	1	....	1	.....	55	21	56
2	....	....	....	10	1	....	....	1	.....	.....	....	2	.....	6	12	57
1	....	....	....	*16*	....	....	....	.....	.....	.....	....	*1*	.....	*4*	*4*	*22*
7	....	4	....	7	....	....	....	.....	.....	.....	....	....	.....	7	15	58
9	....	....	....	*1*	....	....	....	.....	.....	.....	....	*1*	.....	*4*	*8*	*23*
....	....	2	....	....	....	....	....	1	2	.....	....	4	.....	.....	51	59
26	....	....	....	*2*	....	*4*	....	.....	.....	.....	*1*	*6*	.....	*55*	*46*	*24*
9	....	....	....	....	....	....	....	.....	1	1	....	2	.....	6	21	60
1	....	....	....	....	....	....	....	*1*	*1*	.....	....	....	.....	7	*4*	*25*
....	....	....	....	....	....	....	....	.....	1	.....	....	1	.....	.....	11	61
....	....	....	....	....	....	....	....	.....	.....	.....	....	*1*	*1*	.....	*7*	*26*
2	....	....	....	....	....	....	....	.....	.....	.....	1	....	.....	1	8	62
13	....	1	....	1	....	1	....	1	2	.....	....	2	.....	6	12	63
8	....	1	....	....	....	....	....	1	.....	.....	....	....	.....	.....	6	64
4	....	....	....	*3*	....	....	....	.....	.....	.....	....	*1*	.....	.....	*10*	*27*
1	....	....	....	....	....	1	....	.....	.....	1	....	2	.....	1	26	65
43	....	....	....	....	....	....	....	.....	.....	.....	....	2	1	.....	12	66
3	....	....	....	3	....	....	....	1	1	.....	....	....	1	.....	15	67
16	....	....	....	1	....	....	....	.....	.....	.....	....	1	.....	1	13	68
5	....	....	....	....	....	*1*	....	.....	.....	.....	....	*2*	.....	.....	*24*	*28*
....	....	....	....	....	....	....	....	.....	.....	.....	....	1	.....	4	13	69
68	....	6	....	....	....	....	....	.....	1	.....	....	....	.....	29	18	70
4	....	....	....	....	....	1	....	.....	.....	.....	....	....	.....	.....	13	71
....	....	*2*	....	....	....	....	....	*2*	*2*	.....	....	*1*	.....	*1*	*12*	*29*
3	....	1	....	6	....	....	....	.....	.....	.....	....	1	.....	2	8	72
21	....	1	....	101	1	....	....	3	2	.....	....	1	1	6	31	73
77	....	**44**	....	**89**	**2**	**39**	**1**	**20**	**10**	**2**	**3**	**16**	**4**	**93**	**128**	**39**
7	....	12	....	3	....	6	....	4	3	.....	....	3	2	12	31	50
....	....	....	....	....	....	5	....	1	2	.....	....	4	.....	.....	14	51
1	....	5	....	....	....	3	1	1	2	.....	....	....	.....	.....	11	52
....	....	11	....	50	1	11	....	4	1	.....	....	3	.....	6	18	53
64	....	*2*	....	*25*	....	*7*	....	*5*	*2*	.....	....	*1*	*2*	*42*	*20*	*20*
2	....	*1*	....	*9*	....	*5*	....	*1*	.....	*1*	*1*	*1*	.....	*2*	*7*	*21*
2	....	13	....	2	1	....	....	1	.....	1	....	....	.....	7	7	54
....	....	....	....	....	....	2	....	3	.....	.....	1	3	.....	.....	11	55
1	....	....	....	....	....	....	....	.....	.....	.....	*1*	*1*	.....	*24*	*9*	*22*

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (stillbirths excluded)	Stillbirths	Total deaths stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
41 RENSSELAER COUNTY	**122,276**	**121,330**	**2,070**	**72**	**2,266**	**2,805**	**255**	**111**	**991**	**123**	**24**
01 Rensselaer, city	10,711	11,210	127	2	124	81	11	3	62	10	1
02 Troy, city	76,813	75,488	1,428	59	1,654	2,052	201	95	640	86	22
50 Berlin	1,615	1,480	22	...	23	47	3	....	13	....	...
51 Brunswick	2,832	3,010	33	1	32	80	....	....	22	6	...
52 East Greenbush	1,350	1,559	18	1	20	11	2	1	9	1	...
53 Grafton	1,019	948	8	...	20	57	1	....	15	....	...
54 Hoosick	2,783	2,597	46	1	39	57	5	2	17	4	...
20 Hoosick Falls, village	*5,532*	*5,406*	*104*	*2*	*82*	*91*	*11*	*3*	*43*	*3*	...
55 Nassau	1,586	1,608	17	...	24	6	....	1	18	....	...
21 Nassau, village	*529*	*597*	*6*	...	*12*	*1*	*1*	*1*	*9*	....	...
56 North Greenbush	1,293	1,383	24	2	29	47	1	1	15	4	1
57 Petersburg	1,238	1,238	28	1	20	86	4	....	16	1	...
58 Pittstown	2,220	2,092	34	...	22	50	....	....	15	5	...
22 Valley Falls, village (61)	*835*	*795*	*17*	...	*9*	*22*	*2*	....	*1*	*1*	...
59 Poestenkill	1,078	1,134	9	...	12	5	....	....	9	....	...
60 Sandlake	2,128	2,140	30	2	34	32	1	....	25	....	...
61 Schaghticoke (22)	1,880	1,917	28	1	19	6	2	1	9	1	...
23 Schaghticoke, village	*765*	*794*	*3*	...	*13*	*2*	*1*	....	*9*	....	...
62 Schodack	3,384	3,064	40	...	39	17	2	3	23	1	...
24 Castleton, village	*1,396*	*1,583*	*28*	...	*19*	*3*	*2*	....	*9*	....	...
63 Stephentown	1,289	1,287	20	...	20	52	5	....	12	....	...
43 ROCKLAND COUNTY	**46,873**	**46,903**	**867**	**24**	**683**	**740**	**94**	**35**	**257**	**16**	**6**
50 Clarkstown	7,389	7,289	108	5	85	136	5	7	35	4	...
20 Upper Nyack, village	*591*	*642*	*10*	...	*7*	*10*	*1*	....	*4*	*1*	...
51 Haverstraw	1,297	1,518	30	...	11	9	4	1	3	....	...
21 Haverstraw, village	*5,669*	*5,418*	*88*	*3*	*59*	*49*	*8*	*3*	*23*	....	...
22 West Haverstraw, village	*2,369*	*2,330*	*53*	*1*	*29*	*58*	*2*	*1*	*13*	*2*	*1*
52 Orangetown	5,935	5,544	69	...	80	96	10	9	36	....	...
23 Grand View-on-Hudson, village	*368*	*335*	*6*	...	*5*	*1*	....	....	*3*	....	...
24 Nyack, village	*4,619*	*4,291*	*103*	*1*	*110*	*85*	*10*	*5*	*33*	*1*	...
25 Piermont, village	*1,380*	*1,481*	*30*	*1*	*21*	*5*	*8*	*1*	*3*	....	...
26 South Nyack, village	*2,068*	*1,950*	*24*	...	*22*	*30*	*4*	*1*	*9*	....	...
53 Ramapo	5,431	5,782	87	3	99	43	15	2	51	....	...
27 Hillburn, village	*1,090*	*1,017*	*17*	*1*	*11*	*19*	*3*	....	*4*	....	...
28 Spring Valley, village	*2,353*	*2,804*	*61*	*2*	*23*	*31*	*10*	*1*	*6*	....	...
29 Suffern, village	*2,663*	*2,781*	*110*	*6*	*64*	*67*	*7*	*2*	*18*	*7*	*4*
54 Stony Point	3,651	3,721	71	1	42	97	7	1	16	1	1
51 Letchworth Village, Thiells.	.....	.....	.....	...	14	2	....	....	....	....	...
22 State Hospital for Crippled and Deformed Children, West Haverstraw	.....	.....	.....	...	1	2	....	1	....	....	...
44 ST. LAWRENCE COUNTY	**89,005**	**90,291**	**1,853**	**106**	**1,653**	**1,134**	**219**	**53**	**841**	**83**	**10**
01 Ogdensburg, city	15,933	14,338	341	21	504	96	55	13	226	20	5
50 Brasher	2,179	2,270	28	4	36	14	3	2	18	2	1
51 Canton	3,450	3,779	92	2	61	26	6	3	37	1	...
20 Canton, village	*2,701*	*2,624*	*41*	*2*	*42*	*47*	*5*	....	*30*	*1*	...
31 Rensselaer Falls, village	.....	*374*	*6*	...	*8*	*38*	*1*	....	*5*	*1*	...
52 Clare	420	358	10	...	2	11	1	....	1	2	...
53 Clifton	1,674	1,423	25	...	9	11	4	2	2	....	...
54 Colton	1,499	1,362	19	2	30	27	2	1	18	....	...
55 De Kalb	2,209	2,479	42	2	39	9	3	1	27	....	...
21 Richville, village	*307*	*316*	*3*	...	*6*	*2*	....	....	*5*	....	...
56 Depeyster	907	911	21	...	11	51	....	....	9	....	...
57 Edwards	911	803	20	1	7	12	....	....	3	....	...
22 Edwards, village	*476*	*504*	*16*	*2*	*10*	*17*	*1*	....	*5*	*3*	...
58 Fine	2,234	1,579	32	1	33	104	6	2	12	....	...
59 Fowler	1,655	1,493	40	1	13	2	3	....	8	....	...
60 Gouverneur	1,892	1,852	46	2	32	26	6	2	13	2	...
23 Gouverneur, village	*4,128*	*4,164*	*59*	*3*	*63*	*28*	*7*	*1*	*38*	*1*	...

District numbers, population (U. S. Census, April 15, 1910, *and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution:* **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
1454	**16**	**254**	**4**	**316**	**22**	**154**	**19**	**250**	**227**	**4**	**29**	**153**	**46**	**250**	**1726**	**41**
2	....	25	1	1	....	27	1	10	10	.....	.....	6	2	6	103	01
1152	**14**	**196**	**2**	**180**	**16**	**98**	**16**	**204**	**182**	**1**	**26**	**114**	**32**	**135**	**1230**	**02**
5	....	.....	.....	37	....	1	....	3	1	.....	.....	1	.....	1	21	50
42	....	8	....	3	....	5	....	4	2	.....	1	2	.....	12	27	51
2	....	2	.....	.....	.....	1	....	1	5	.....	.....	1	1	4	13	52
46	....	1	....	8	1	1	....	1	.....	.....	.....	2	.....	.....	17	53
7	....	5	1	7	1	4	....	6	3	.....	.....	2	1	24	31	54
27	....	*8*	....	*5*	*2*	*5*	*1*	*7*	*7*	*1*	....	*5*	*6*	*35*	*61*	*20*
4	....	.....	.....	.....	.....	1	1	1	.....	.....	.....	.....	.....	.....	23	55
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*1*	.....	.....	.....	.....	*12*	*21*
31	....	3	.....	.....	.....	8	....	1	1	.....	.....	2	1	.....	24	56
75	1	.....	.....	7	.....	.....	.....	1	1	.....	.....	.....	.....	2	18	57
7	....	.....	.....	32	.....	.....	.....	1	2	.....	.....	1	.....	5	19	58
.....	.....	.....	.....	*17*	*1*	.....	.....	*3*	*1*	.....	.....	.....	.....	*1*	*7*	*22*
1	....	3	.....	.....	.....	.....	.....	1	.....	.....	1	2	.....	.....	9	59
22	....	1	.....	.....	.....	.....	.....	.....	2	.....	.....	3	1	9	28	60
4	....	.....	.....	.....	.....	.....	.....	1	3	.....	.....	2	.....	.....	14	61
.....	.....	.....	.....	.....	.....	.....	.....	*1*	*2*	*1*	.....	.....	.....	.....	*11*	*23*
6	....	2	....	4	....	2	....	1	1	.....	.....	5	.....	1	33	62
.....	.....	.....	.....	.....	.....	.....	.....	*3*	*3*	.....	*1*	*5*	*1*	.....	*9*	*24*
21	1	.....	.....	15	1	1	.....	.....	1	.....	.....	.....	1	15	16	63
148	**5**	**57**	**1**	**41**	**3**	**68**	**8**	**93**	**52**	**13**	**5**	**42**	**25**	**304**	**536**	**43**
56	1	9	....	2	1	7	2	10	10	1	....	1	.....	47	70	50
1	....	.....	.....	.....	.....	.....	.....	.....	.....	*1*	*1*	.....	.....	*7*	*6*	*20*
6	....	1	.....	.....	.....	.....	.....	1	1	.....	.....	.....	1	1	9	51
17	....	*6*	....	*2*	....	*4*	*1*	*10*	*4*	.....	....	*2*	*2*	*10*	*50*	*21*
23	....	*6*	*1*	*5*	....	*1*	....	*7*	*2*	*2*	*1*	*1*	*1*	*12*	*22*	*22*
22	4	15	....	3	1	17	1	12	1	2	1	6	3	25	63	52
.....	.....	.....	.....	.....	.....	.....	.....	*1*	*1*	.....	.....	.....	.....	.....	*4*	*23*
1	....	*9*	....	*1*	....	*5*	*1*	*12*	*5*	*2*	....	*14*	*4*	*54*	*86*	*24*
1	....	*1*	....	.....	*1*	.....	.....	*4*	*3*	*1*	....	*2*	*2*	.....	*13*	*25*
2	....	.....	.....	.....	.....	*5*	*1*	*2*	*2*	.....	.....	*2*	*2*	*21*	*15*	*26*
6	....	5	.....	.....	.....	7	1	18	14	1	....	7	4	6	73	53
1	....	.....	.....	.....	.....	*1*	....	*1*	.....	.....	.....	.....	*1*	*16*	*10*	*27*
6	....	.....	.....	.....	.....	*5*	*1*	*7*	.....	.....	.....	*1*	*2*	*13*	*19*	*28*
5	....	*1*	....	*26*	....	*10*	....	*5*	*3*	.....	.....	*3*	*1*	*13*	*53*	*29*
1	....	4	....	2	....	6	....	4	5	1	....	3	2	78	31	54
....	....	....	....	....	....	....	....	1	1	1	1	....	.....	.....	12	51
....	....	....	....	....	....	....	....	.....	.....	1	1	....	.....	1	....	22
406	**10**	**26**	**1**	**255**	**7**	**80**	**6**	**108**	**75**	**20**	**14**	**108**	**37**	**156**	**1385**	**44**
30	**4**	....	.....	.....	....	**14**	**2**	**26**	**27**	**4**	**6**	**23**	**8**	**2**	**429**	**01**
2	....	.....	.....	6	.....	.....	1	3	3	1	....	5	.....	.....	26	51
18	....	.....	.....	.....	.....	1	....	2	3	1	....	.....	3	3	55	51
43	....	.....	.....	*2*	....	.....	....	.....	*1*	*1*	....	*1*	.....	.....	*40*	*20*
36	....	.....	.....	.....	.....	.....	.....	*1*	*1*	.....	.....	.....	.....	.....	*7*	*31*
2	....	.....	.....	.....	.....	7	....	.....	.....	.....	.....	.....	.....	.....	2	52
.....	.....	.....	.....	.....	.....	8	....	.....	.....	1	....	.....	1	2	8	53
.....	.....	.....	.....	9	.....	.....	.....	2	.....	.....	1	2	.....	16	27	54
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	3	36	55
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	21
35	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	2	.....	14	9	56
2	.....	.....	.....	5	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	7	57
.....	.....	.....	.....	*7*	.....	*6*	.....	*1*	*1*	.....	.....	.....	.....	.....	*9*	*22*
29	....	9	....	53	1	4	....	3	2	.....	.....	5	.....	6	25	58
.....	.....	.....	.....	.....	.....	.....	.....	2	1	.....	.....	2	.....	.....	10	59
15	1	.....	.....	.....	.....	1	....	3	2	.....	.....	3	.....	6	25	60
2	....	*2*	....	*16*	*1*	*1*	....	*6*	*3*	.....	*1*	*9*	*1*	.....	*48*	*23*

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June* 1, 1915), *births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
ST. LAWRENCE COUNTY—*(Concluded)*											
61 Hammond	1,341	1,267	29	3	20	1	1	....	14	....	....
24 Hammond, village	*404*	*418*	*7*	....	*9*	*1*	*1*	....	*6*	....	....
62 Hermon	939	988	15	....	15	11	1	....	11	1	....
25 Hermon, village	*587*	*607*	*8*	....	*13*	*14*	....	*2*	*9*	....	....
63 Hopkinton	1,469	1,511	32	2	21	12	3	....	9	1	....
64 Lawrence	1,676	1,782	23	2	23	67	2	....	14	1	....
65 Lisbon	2,981	3,120	44	3	38	9	5	....	20	2	....
66 Louisville	1,492	1,476	35	1	23	20	5	2	7	1	1
67 Macomb	1,168	1,204	28	....	14	20	1	....	6	1	....
68 Madrid	1,457	1,471	16	2	19	30	1	....	15	....	....
69 Massena	1,865	2,476	76	4	46	23	16	7	10	8	....
26 Massena, village	*2,951*	*4,614*	*153*	*9*	*78*	*97*	*25*	*6*	*21*	*19*	*2*
70 Morristown	1,348	1,306	17	....	13	7	....	....	9	1	....
27 Morristown, village	*540*	*479*	*6*	....	*5*	*16*	*1*	....	*4*	....	....
71 Norfolk	2,877	2,770	70	5	48	36	12	3	21	1	....
28 Norwood, village (77)	*1,993*	*1,879*	*40*	*3*	*36*	*42*	*5*	*1*	*18*	....	....
72 Oswegatchie	2,235	1,837	24	....	34	34	7	....	17	....	....
32 Heuvelton, village	.....	*556*	*6*	....	*11*	*2*	....	....	*11*	....	....
73 Parishville	1,785	1,678	21	....	23	27	2	....	16	....	....
74 Piercefield	770	1,303	45	3	11	5	3	....	3	1	....
75 Pierrepont	1,628	1,579	26	2	25	29	2	....	14	....	....
76 Pitcairn	816	755	17	3	18	10	....	....	9	....	....
77 Potsdam (28)	2,757	3,132	59	6	43	7	5	1	27	....	....
29 Potsdam, village	*4,036*	*4,157*	*78*	*6*	*53*	*16*	*9*	*2*	*26*	*10*	....
78 Rossie	981	932	18	....	13	1	1	....	10	1	1
79 Russell	1,842	1,806	43	5	27	47	5	1	12	2	....
80 Stockholm	2,614	2,655	51	2	37	9	3	1	25	....	....
81 Waddington	1,157	1,178	19	1	14	19	....	....	8	....	....
30 Waddington, village	*731*	*726*	*7*	*1*	*17*	*1*	....	....	*12*	....	....
01 St. Lawrence State Hospital, Ogdensburg	.....	.....	.....	....	190	36	....	....	100	17	2
45 SARATOGA COUNTY	**61,917**	**62,982**	**1,198**	**53**	**1,003**	**1,062**	**99**	**33**	**500**	**76**	**10**
01 Saratoga Springs, city	**12,693**	**13,792**	**242**	**12**	**275**	**344**	**13**	**6**	**143**	**8**	**1**
02 Mechanicville, city	**6,634**	**8,208**	**233**	**17**	**85**	**80**	**13**	**5**	**29**	**37**	**4**
50 Ballston	1,542	1,896	18	....	30	35	2	1	14	....	....
20 Ballston Spa, village (61)	*4,138*	*4,344*	*58*	*1*	*65*	*223*	*6*	*2*	*31*	*4*	....
51 Charlton	1,030	1,080	17	....	13	20	2	....	9	1	....
52 Clifton Park	2,225	2,391	31	....	19	31	....	2	11	3	....
53 Corinth	936	246	26	1	16	3	6	....	8	1	....
21 Corinth, village	*2,166*	*2,415*	*55*	*5*	*25*	*2*	*2*	*1*	*13*	....	....
54 Day	628	541	13	....	3	.....	.....	....	3	....	....
55 Edinburg	793	785	10	1	11	.....	2	1	5	....	....
56 Galway	1,093	1,174	22	1	14	21	1	1	9	....	....
22 Galway, village	*112*	*104*	*2*	....	.....	*3*	.....	.....	.....	.....	.....
57 Greenfield	1,552	1,642	30	....	19	16	4	....	5	1	1
58 Hadley	672	689	14	....	7	.....	2	....	3	....	....
59 Halfmoon	1,742	1,213	20	....	26	37	1	2	15	3	2
60 Malta	1,285	1,298	14	2	22	31	2	....	16	....	....
61 Milton (20)	2,135	1,926	25	....	53	21	1	....	38	8	1
62 Moreau	1,093	1,134	22	1	30	5	2	....	7	....	....
24 South Glens Falls, village	*2,247*	*2,106*	*40*	*1*	*33*	*31*	*4*	....	*19*	*4*	*1*
63 Northumberland	1,127	1,120	26	1	17	3	4	....	11	....	....
64 Providence	520	512	12	....	23	5	.....	....	3	....	....
65 Saratoga	1,580	1,446	20	2	31	6	....	2	22	....	....
25 Schuylerville, village	*1,614*	*1,711*	*35*	*1*	*21*	*6*	*4*	*1*	*11*	*1*	....
26 Victory Mills, village	*748*	*657*	*8*	*1*	*17*	*1*	*3*	....	*4*	....	....
66 Saratoga Springs	1,017	*	.....	.....	.....	.....	.....	.....	.....	.....	.....
67 Stillwater (23)	2,555	2,934	62	....	38	14	6	4	18	1	....
27 Stillwater, village	*1,004*	*1,041*	*14*	....	*17*	*11*	*1*	....	*11*	*2*	....
68 Waterford	2,883	2,440	61	1	37	55	6	2	21	1	....
28 Waterford, village	*3,245*	*3,047*	*52*	*4*	*42*	*54*	*10*	*3*	*15*	*1*	....
69 Wilton	908	1,090	16	1	14	4	2	....	6	....	....

*Included in city of Saratoga Springs.

District numbers, population (U. S. Census, April 25, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles, 6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases reportable diseases	Deaths	
....	....	....	....	....	....	1	....	.....	.....	.....	....	4	.....	.....	16	61
1	*1*	....	....	....	....	....	....	.....	.....	.....	....	*1*	.....	.....	*7*	*24*
....	....	....	....	3	....	7	....	.....	.....	.....	....	1	.....	.....	14	62
....	....	....	....	....	....	*12*	....	*1*	*1*	.....	....	*1*	.....	*1*	*11*	*25*
5	....	....	....	3	....	1	....	1	1	.....	1	2	.....	1	17	63
48	....	....	....	....	....	....	....	3	.....	1	....	1	.....	14	22	64
6	1	....	....	....	....	....	....	1	1	.....	....	3	.....	.....	33	65
....	....	5	....	7	....	1	....	1	1	.....	....	1	2	5	18	66
9	....	....	....	....	....	....	....	3	2	.....	....	1	.....	7	11	67
5	1	1	....	8	....	....	....	3	2	.....	....	1	.....	13	15	68
2	....	1	....	....	1	1	....	4	2	.....	1	2	7	7	33	69
7	*1*	....	....	*35*	*1*	*4*	....	*7*	*2*	*4*	*1*	*4*	*8*	*21*	*59*	*26*
3	....	....	....	1	....	....	....	2	1	.....	....	.....	.....	.....	12	70
15	....	....	....	*1*	....	....	....	.....	.....	.....	....	.....	*1*	.....	*4*	*27*
....	....	....	....	20	....	....	....	9	1	.....	....	4	2	6	41	71
6	....	*3*	*1*	*10*	....	*1*	....	*8*	*4*	*1*	....	*3*	*1*	*13*	*27*	*28*
16	1	....	....	16	....	....	1	2	3	.....	....	6	.....	.....	23	72
2	....	....	....	....	....	....	....	.....	.....	.....	....	*3*	.....	.....	*8*	*32*
....	....	....	....	21	....	....	....	2	1	.....	1	3	.....	4	18	73
....	....	....	....	1	....	....	....	2	.....	1	....	.....	.....	.....	11	74
1	....	....	....	23	....	4	1	.....	1	.....	....	.....	.....	1	23	75
4	....	5	....	....	....	1	....	.....	.....	.....	1	3	.....	.....	14	76
....	....	....	....	1	1	....	....	2	1	3	....	4	.....	1	37	77
....	....	....	....	*1*	*1*	....	....	*3*	*2*	*2*	*1*	*3*	.....	.....	*46*	*29*
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	12	78
38	....	....	....	....	1	....	....	2	2	.....	....	.....	1	4	24	79
3	....	....	....	4	....	....	....	.....	.....	.....	....	2	2	2	33	80
13	....	....	....	....	....	....	....	.....	2	2	....	.....	.....	4	12	81
....	....	....	....	....	....	....	1	*1*	*1*	.....	....	.....	.....	.....	*15*	*30*
....	....	....	....	....	....	....	....	17	19	2	2	3	.....	1	64	01
357	**1**	**36**	....	**65**	**2**	**120**	**7**	**88**	**78**	**8**	**6**	**69**	**15**	**312**	**815**	**45**
19	....	**16**	....	**11**	....	**8**	....	**29**	**11**	**4**	**3**	**27**	**2**	**249**	**231**	**01**
18	....	**8**	....	**2**	....	**5**	**1**	**9**	**6**	**1**	....	**3**	**2**	.....	**69**	**02**
31	....	....	....	....	....	1	....	1	.....	.....	....	2	.....	2	28	50
95	*1*	....	....	*20*	*1*	*76*	*2*	*6*	*3*	.....	....	*1*	*1*	*22*	*56*	*20*
12	....	1	....	....	....	....	....	5	1	.....	....	.....	.....	1	12	51
9	....	....	....	17	1	2	....	.....	.....	.....	....	.....	2	.....	16	52
....	....	....	....	....	....	2	....	.....	.....	.....	....	.....	.....	1	15	53
....	....	....	....	....	....	*1*	*1*	.....	*1*	.....	*1*	*2*	*1*	*1*	*19*	*21*
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	3	54
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	2	.....	9	55
16	....	....	....	....	....	3	....	1	1	.....	....	1	.....	1	12	56
3	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	.....	*22*
1	....	1	....	4	....	....	....	4	3	.....	....	1	.....	5	14	57
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	7	58
27	....	1	....	....	....	....	....	3	1	1	1	....	1	2	21	59
15	....	....	....	....	....	1	....	2	2	1	....	5	.....	12	15	60
6	....	2	....	....	....	4	....	1	1	.....	....	2	.....	.....	49	61
3	....	....	....	....	....	1	....	1	11	.....	....	3	.....	.....	16	62
18	....	*2*	....	....	....	*4*	*1*	*3*	*2*	.....	....	*3*	.....	.....	*26*	*24*
3	....	....	....	....	....	....	....	.....	.....	.....	....	2	.....	.....	15	63
1	....	....	....	....	....	3	....	1	20	.....	....	.....	.....	.....	3	64
2	....	....	....	1	....	1	1	2	.....	.....	....	2	1	.....	27	65
2	....	....	....	....	....	....	....	3	3	.....	....	*2*	.....	.....	*16*	*25*
....	....	....	....	....	....	....	....	1	*2*	.....	....	.....	*1*	.....	*14*	*26*
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	.....	66
3	....	1	....	....	....	3	1	5	3	.....	....	5	1	1	28	67
6	....	....	....	....	....	*2*	....	*1*	.....	.....	....	*2*	.....	.....	*15*	*27*
36	....	1	....	4	....	2	....	4	1	.....	....	4	1	7	31	68
31	....	*1*	....	*6*	....	....	....	*5*	*5*	*1*	*1*	....	*1*	*9*	*35*	*28*
....	....	2	....	....	....	1	....	1	1	.....	....	.....	.....	.....	13	69

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
46 SCHENECTADY COUNTY	88,235	**98,625**	**2,693**	**70**	**1,313**	**3,372**	**258**	**66**	**471**	**48**	**4**
01 Schenectady, city	72,826	**80,381**	**2,366**	**63**	**1,100**	**2,880**	**229**	**60**	**384**	**39**	**4**
50 Duanesburg	2,211	2,280	35	1	29	90	1	2	17	...	...
51 Glenville	2,244	2,748	27	2	54	40	3	1	15	...	...
20 Scotia, village	*2,957*	*3,790*	*76*	...	*35*	*87*	*4*	*2*	*20*	*7*	...
52 Niskayuna	1,907	2,607	40	...	26	93	4	...	10	1	...
53 Princetown	684	621	9	...	12	1	1	...	9	...	...
54 Rotterdam	5,406	6,198	140	4	57	181	16	1	16	1	...
47 SCHOHARIE COUNTY	23,855	**23,005**	**377**	**17**	**409**	**355**	**33**	**5**	**285**	**10**	**1**
50 Blenheim	616	530	12	...	11	3	...	...	10	...	...
51 Broome	933	756	14	1	10	7	1	...	5	...	...
52 Carlisle	1,024	963	8	...	16	4	1	...	12	...	...
53 Cobleskill	1,491	1,508	41	2	42	41	4	...	26	1	...
20 Cobleskill, village	*2,088*	*2,362*	*26*	*1*	*21*	*111*	*3*	...	*14*	*3*	...
54 Conesville	708	681	11	1	8	6	1	...	3	...	...
55 Esperance	714	729	7	1	12	7	...	...	8	...	...
21 Esperance, village	*263*	*241*	*4*	...	*7*	*6*	...	...	*7*	...	...
56 Fulton	1,450	1,350	28	1	28	8	1	2	16	...	...
57 Gilboa	1,467	1,420	30	1	21	41	...	...	15	...	...
58 Jefferson	1,280	1,181	32	...	27	30	5	...	18	...	...
59 Middleburg	1,439	1,194	17	...	27	1	1	...	20	...	...
22 Middleburg, village	*1,114*	*1,059*	*15*	*1*	*22*	*11*	*2*	...	*19*	...	...
60 Richmondville	831	893	12	2	15	15	...	...	15	...	...
23 Richmondville, village	*599*	*567*	*5*	...	*13*	*9*	...	...	*11*	*2*	...
61 Schoharie	1,530	1,314	30	1	23	6	2	1	14	1	1
24 Schoharie, village	*996*	*1,124*	*8*	...	*15*	*4*	*1*	...	*11*	*1*	...
62 Seward	1,419	1,380	25	...	19	9	2	...	13	...	...
63 Sharon	1,366	1,250	22	1	29	7	5	2	17	...	...
25 Sharon Springs, village	*459*	*531*	*4*	...	*8*	*2*	*1*	...	*7*	...	...
64 Summit	1,105	1,046	17	2	21	21	3	...	16	1	...
65 Wright	963	926	9	2	14	6	...	...	8	1	...
48 SCHUYLER COUNTY	14,004	**13,954**	**275**	**8**	**268**	**314**	**22**	**7**	**179**	**7**	**1**
50 Catherine	892	857	13	...	18	8	2	...	13	...	...
20 Odessa, village	*330*	*335*	*5*	...	*8*	*14*	*1*	...	*6*	...	...
51 Cayuta	345	346	3	...	8	18	...	...	5	1	...
52 Dix	1,167	1,154	14	1	13	45	...	1	9	...	...
21 Watkins, village (56)	*2,817*	*2,760*	*74*	*2*	*57*	*107*	*11*	*1*	*27*	*3*	*1*
53 Hector	3,132	3,173	62	1	53	31	2	2	39	2	...
22 Burdett, village	*382*	*375*	8	...	8	...	...	1	6	...	...
54 Montour	400	395	6	...	7	4	...	...	4	1	...
23 Montour Falls, village	*1,208*	*1,281*	*29*	*1*	*35*	*25*	*2*	...	*27*	...	...
55 Orange	1,087	982	16	...	23	42	2	1	15	...	...
56 Reading (21)	959	1,039	25	...	14	7	1	...	12	...	...
57 Tyrone	1,285	1,257	20	3	24	13	1	1	16	...	...
49 SENECA COUNTY	26,972	**25,249**	**416**	**14**	**689**	**533**	**28**	**10**	**405**	**15**	**3**
50 Covert	1,254	1,200	19	...	14	28	4	...	9	...	...
20 Interlaken, village	*693*	*663*	*4*	*1*	*14*	*35*	...	...	*11*	...	...
51 Fayette	2,030	1,986	33	1	33	15	2	...	17	1	...
21 Waterloo, village (59)	*3,931*	*4,343*	*73*	*2*	*69*	*7*	*6*	*2*	*45*	*2*	...
52 Junius	957	942	18	1	16	2	...	...	12	...	...
53 Lodi	1,408	1,399	15	1	17	20	1	...	15	...	...
54 Ovid	2,807	1,153	10	...	28	14	1	...	15	...	1
22 Ovid, village	*548*	*591*	*1*	...	*16*	*3*	*1*	...	*12*	*3*	*1*
55 Romulus	2,803	2,098	33	...	29	57	2	1	15	3	1
56 Seneca Falls	819	613	18	1	16	5	1	1	9	...	...
23 Seneca Falls, village	*6,588*	*7,018*	*144*	*5*	*101*	*200*	*7*	*5*	*45*	*1*	...
57 Tyre	900	895	13	...	7	...	1	...	4	...	...
58 Varick	1,173	1,273	20	2	18	26	1	...	13	...	...
59 Waterloo (21)	1,061	1,075	15	...	19	3	1	1	13	1	...
54–55 Willard State Hospital	...	...	...	...	292	118	...	...	170	4	...

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles, 6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
2158	**10**	**123**	**2**	**247**	**5**	**105**	**7**	**183**	**104**	**4**	**14**	**85**	**86**	**504**	**996**	**46**
1762	**8**	**97**	**1**	**227**	**5**	**97**	**6**	**173**	**64**	**1**	**13**	**78**	**78**	**484**	**843**	**01**
69	....	8	1	3	....	....	....	1	3	....	....	....	....	9	25	50
36	....	2	....	....	....	....	....	1	26	....	....	2	....	1	26	51
68	....	*3*	....	*2*	....	*1*	....	*3*	*3*	*1*	....	....	....	*2*	*32*	*20*
71	....	5	....	13	....	....	....	2	3	1	1	1	2	....	19	52
....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	11	53
152	2	8	....	2	....	7	1	3	4	....	....	4	6	8	40	54
123	....	**19**	....	**117**	**1**	**6**	....	**33**	**21**	**1**	....	**29**	**1**	**46**	**356**	**47**
1	....	....	....	....	....	....	....	2	....	....	....	....	....	....	11	50
5	....	1	....	....	....	....	....	1	1	....	....	2	....	....	7	51
2	....	....	....	....	....	....	....	2	1	....	....	2	....	....	13	52
24	....	1	....	4	....	1	....	2	1	....	....	5	....	8	36	53
59	....	*12*	....	*26*	....	....	....	*2*	*2*	....	....	*1*	....	*9*	*18*	*20*
1	....	....	....	3	....	....	....	....	....	....	....	1	....	2	7	54
....	....	....	....	4	....	1	....	1	....	....	....	....	....	1	12	55
1	....	....	....	*3*	....	*1*	....	*1*	*1*	....	....	*1*	....	....	*5*	*21*
....	....	....	....	....	....	1	....	2	1	....	....	3	....	5	24	56
10	....	....	....	30	....	....	....	....	....	....	....	....	....	1	21	57
8	....	....	....	20	1	....	....	2	2	....	....	....	1	....	23	58
....	....	....	....	1	....	....	....	....	1	....	....	1	....	....	25	59
....	....	*4*	....	....	....	....	....	*3*	....	....	....	*2*	....	*4*	*20*	*22*
3	....	1	....	5	....	....	....	6	1	....	....	2	....	....	12	60
1	....	....	....	....	....	*2*	....	....	*1*	....	....	*1*	....	*4*	*11*	*23*
....	....	....	....	....	....	....	....	3	2	1	....	2	....	1	18	61
1	....	....	....	....	....	....	....	*2*	*2*	....	....	....	....	....	*13*	*24*
3	....	....	....	2	....	....	....	....	....	....	....	3	....	4	16	62
....	....	....	....	1	....	....	....	1	2	....	....	1	....	5	26	63
....	....	....	....	*1*	....	....	....	*1*	....	....	....	....	....	....	*8*	*25*
....	....	....	....	17	....	....	....	1	2	....	....	2	....	2	17	64
4	....	....	....	....	....	....	....	1	1	....	....	....	....	....	13	65
110	....	**27**	....	**89**	**2**	**2**	....	**10**	**7**	**1**	**2**	**17**	**2**	**68**	**237**	**48**
1	....	6	....	....	....	....	....	....	....	....	....	1	1	1	16	50
....	....	*2*	....	....	....	....	....	....	....	....	....	....	....	*12*	*8*	*20*
14	....	....	....	....	....	....	....	....	....	....	....	3	....	3	5	51
31	....	2	....	2	....	....	....	....	....	....	....	....	....	10	13	52
8	....	*5*	....	*73*	*2*	....	....	*3*	*2*	....	....	*2*	*1*	*15*	*49*	*21*
....	....	5	....	11	....	....	....	4	1	1	....	4	....	8	48	53
....	....	....	....	....	....	....	....	....	....	....	*1*	....	....	....	*7*	*22*
....	....	1	....	....	....	....	....	....	....	....	....	....	....	2	7	54
11	....	*4*	....	....	....	*1*	....	*2*	....	....	*1*	*5*	....	7	*29*	*23*
38	....	1	....	....	....	....	....	....	1	....	....	2	....	3	20	55
....	....	1	....	3	....	....	....	....	1	....	....	....	....	3	13	56
7	....	....	....	....	....	1	....	1	2	....	....	....	....	4	22	57
184	....	**28**	....	**9**	....	**18**	**3**	**125**	**78**	**5**	**9**	**33**	**1**	**149**	**562**	**49**
2	....	2	....	....	....	....	....	2	....	....	....	....	....	22	14	50
....	....	....	....	....	....	....	....	*1*	....	....	....	*1*	....	*34*	*13*	*20*
2	....	....	....	1	....	1	....	3	3	....	1	1	....	7	28	51
....	....	....	....	....	....	*1*	....	....	*5*	....	....	*2*	....	*4*	*62*	*21*
....	....	1	....	....	....	....	....	....	....	....	....	2	....	1	14	52
6	....	....	....	6	....	....	....	2	....	....	....	1	....	6	16	53
....	....	9	....	....	....	1	....	1	1	....	....	1	....	3	25	54
....	....	....	....	....	....	....	....	....	*1*	....	....	*1*	....	....	*13*	*22*
14	....	....	....	....	....	3	....	2	....	....	1	....	1	35	26	55
2	....	....	....	....	....	....	....	2	2	....	....	1	....	1	13	56
146	....	*15*	....	*9*	*3*	....	....	*6*	*4*	....	*1*	*10*	....	*23*	*83*	*23*
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7	57
10	....	1	....	2	....	....	....	1	....	....	....	1	....	12	17	58
2	....	....	....	....	....	....	....	....	....	....	....	2	....	....	17	59
																54
	....		....		....	3	....	105	62	5	6	10	....	1	214	55

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
50 STEUBEN COUNTY	**83,362**	**83,630**	**1,562**	**59**	**1,431**	**2,345**	**128**	**26**	**837**	**49**	**5**
01 Corning, city	**13,730**	**13,459**	**355**	**9**	**266**	**215**	**37**	**8**	**105**	**14**	**4**
02 Hornell, city	**13,617**	**14,352**	**290**	**10**	**194**	**835**	**23**	**4**	**88**	**3**	...
50 Addison	505	406	4	...	10	9	3	....	5	....	...
20 Addison, village	*2,004*	*1,754*	*16*	...	*32*	*45*	*1*	....	*25*	*2*	...
51 Avoca	1,083	1,025	19	1	13	3	1	....	11	....	...
21 Avoca, village	*1,057*	*1,083*	*21*	...	*9*	*10*	....	*1*	*5*	*1*	...
52 Bath	4,083	3,428	37	...	60	15	3	....	43	....	...
22 Bath, village	*3,884*	*4,173*	*72*	*3*	*93*	*43*	*9*	*2*	*44*	*4*	...
23 Savona, village	*587*	*571*	*4*	...	*15*	*7*	....	....	*10*	....	...
53 Bradford	613	629	11	...	10	1	....	....	8	1	...
54 Cameron	1,066	957	14	2	8	18	1	....	5	....	...
55 Campbell	1,204	1,106	24	2	17	....	1	....	12	....	...
56 Canisteo	1,182	1,080	21	...	16	4	2	....	11	....	...
24 Canisteo, village	*2,259*	*2,314*	*36*	...	*32*	*88*	*1*	*3*	*17*	*1*	*1*
57 Caton	1,078	1,053	16	...	19	19	1	....	14	....	...
58 Cohocton	2,088	2,145	23	4	16	112	1	....	12	....	...
25 Cohocton, village	*838*	*958*	*8*	...	*7*	*26*	....	....	*6*	....	...
59 Corning	2,391	2,580	50	4	41	27	5	1	15	6	...
60 Dansville	1,303	1,269	32	2	18	50	2	....	14	....	...
61 Erwin	987	1,150	22	...	17	14	1	2	9	2	...
26 Painted Post, village	*1,224*	*1,319*	*39*	*1*	*23*	*25*	*2*	....	*11*	*6*	...
62 Fremont	860	812	9	...	7	50	....	....	4	....	...
63 Greenwood	1,111	1,142	17	4	12	4	3	....	7	....	...
64 Hartsville	651	638	6	1	7	2	....	....	6	....	...
65 Hornby	870	842	11	...	12	....	1	1	8	....	...
66 Hornellsville	2,047	1,515	44	4	51	51	5	1	19	....	...
31 Arkport, village	.....	*538*	*11*	*2*	*1*	*61*	....	....	*1*	*2*	...
67 Howard	1,461	1,386	20	2	22	3	2	1	16	....	...
68 Jasper	1,264	1,253	30	...	15	21	2	....	10	....	...
69 Lindley	1,153	1,181	17	1	19	6	....	....	14	5	...
70 Prattsburg	1,150	1,102	12	...	9	2	1	1	3	....	...
27 Prattsburg, village	*684*	*696*	*7*	...	*9*	*4*	....	....	*6*	....	...
71 Pulteney	1,316	1,335	17	1	24	17	3	....	18	....	...
72 Rathbone	917	869	13	...	14	7	....	....	11	....	...
73 Thurston	840	855	16	...	8	....	....	....	5	....	...
74 Troupsburg	1,712	1,532	45	2	20	9	4	....	9	....	...
75 Tuscarora	1,006	955	9	...	14	22	3	....	8	1	...
76 Urbana	1,405	1,536	22	...	17	73	2	1	10	....	...
28 Hammondsport, village	*1,254*	*1,560*	*24*	*1*	*15*	*182*	....	....	*8*	....	...
77 Wayland	1,444	1,400	24	2	13	56	2	....	8	1	...
29 Wayland, village	*1,392*	*1,699*	*32*	...	*25*	*157*	*2*	....	*14*	....	...
78 Wayne	643	686	11	...	8	35	....	....	5	....	...
79 West Union	985	885	23	...	7	3	....	....	3	....	...
80 Wheeler	959	892	10	...	9	....	1	....	7	....	...
81 Woodhull	1,139	1,158	14	1	8	1	3	....	2	....	...
30 Woodhull, village	*316*	*352*	*4*	...	*6*	....	....	....	*6*	....	...
52 New York Soldiers' and Sailors' Home, Bath	.....	.....	...	...	163	13	....	....	159	....	...
51 SUFFOLK COUNTY	**96,138**	**104,342**	**1,933**	**63**	**2,452**	**2,055**	**133**	**46**	**1030**	**130**	**7**
50 Babylon	3,913	5,310	78	4	78	30	1	1	42	1	...
20 Amityville, village	*2,517*	*2,780*	*37*	...	*102*	*5*	*4*	*2*	*48*	....	...
21 Babylon, village	*2,600*	*3,100*	*73*	*3*	*56*	*12*	*4*	*1*	*24*	....	...
51 Brookhaven	12,494	14,435	261	5	258	223	16	1	134	5	1
22 Bellport, village	*419*	*499*	*6*	*1*	*6*	*5*	*1*	....	*4*	....	...
23 Patchogue, village	*3,824*	*4,506*	*56*	*1*	*51*	*126*	*5*	*2*	*24*	....	...
28 Shoreham, village	.....	*151*	.....	.....	.....	*1*	....	....	.....	.....	.....
52 Easthampton	3,554	4,018	80	...	39	146	5	2	18	1	...
24 Sag Harbor, village (58)	*3,408*	*3,245*	*70*	*3*	*32*	*141*	*1*	*3*	*21*	*1*	...
53 Huntington	9,908	12,717	292	14	187	55	19	12	86	8	1
25 Northport, village	*2,096*	*2,527*	*27*	*1*	*21*	*5*	....	....	*10*	*1*	...
54 Islip	18,346	17,658	318	12	189	221	14	5	99	1	1
55 Riverhead	5,345	5,730	111	2	73	110	10	2	44	....	...

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
1069	**1**	**57**	**2**	**423**	**7**	**229**	**16**	**53**	**49**	**10**	**8**	**107**	**17**	**455**	**1219**	**50**
22	....	**15**	**1**	**15**	....	**94**	**3**	**13**	**15**	**3**	**2**	**13**	**9**	**39**	**219**	**01**
411	....	**23**	**1**	**158**	**2**	**72**	**3**	**8**	**10**	.....	....	**17**	**5**	**160**	**156**	**02**
....	....	....	....	8	1	....	....	.....	1	.....	....	.....	.....	1	8	50
....	....	....	....	*35*	....	....	....	.....	.....	*1*	*1*	*4*	.....	*7*	*27*	*20*
3	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	13	51
4	....	....	....	....	*1*	*1*	....	*1*	.....	*1*	*1*	....	.....	*2*	*7*	*21*
2	....	1	....	4	....	3	....	2	.....	.....	....	6	1	3	53	52
9	....	....	....	*9*	....	*14*	*2*	*3*	*2*	.....	*2*	*7*	.....	*4*	*80*	*22*
6	....	....	....	....	....	....	....	.....	*1*	.....	....	*2*	.....	*1*	*12*	*23*
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	10	53
5	....	4	....	7	....	....	....	.....	.....	.....	....	.....	.....	2	8	54
....	....	....	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	16	55
2	....	....	....	....	....	....	....	.....	.....	.....	....	2	.....	2	14	56
18	....	....	....	*19*	*1*	*3*	*1*	*2*	*3*	*1*	....	*6*	*1*	*44*	*19*	*24*
4	....	1	....	....	....	6	....	1	1	.....	....	2	.....	7	16	57
100	....	....	....	....	....	3	....	1	.....	.....	....	.....	.....	8	16	58
11	....	....	....	*5*	....	....	....	.....	.....	.....	....	*1*	.....	*10*	*6*	*25*
3	....	3	....	....	....	13	2	1	2	.....	1	5	.....	1	31	59
8	....	....	....	36	....	....	....	.....	.....	.....	....	.....	.....	6	18	60
7	....	2	....	....	....	....	....	1	1	.....	....	.....	.....	2	16	61
2	....	*1*	....	....	....	*6*	*1*	.....	.....	.....	....	*2*	.....	*10*	*20*	*26*
9	....	....	....	16	....	1	....	.....	.....	.....	....	.....	.....	24	7	62
4	....	....	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	11	63
1	....	....	....	....	....	1	....	.....	.....	.....	....	.....	.....	.....	7	64
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	12	65
20	....	....	....	17	1	6	1	2	3	.....	....	3	.....	6	43	66
8	....	....	....	*23*	....	....	....	.....	.....	.....	....	.....	.....	*28*	*1*	*31*
1	....	....	....	1	1	....	....	1	.....	.....	....	2	.....	.....	19	67
9	....	1	....	8	....	....	....	.....	.....	.....	....	1	.....	3	14	68
....	....	....	....	....	....	....	....	.....	.....	.....	....	2	.....	1	17	69
....	....	....	....	....	....	....	....	.....	1	1	....	1	.....	1	7	70
....	....	....	....	....	....	....	....	.....	*1*	*1*	....	.....	.....	*3*	*8*	*27*
13	....	1	....	2	....	....	....	1	1	.....	....	3	.....	.....	20	71
1	....	....	....	6	....	....	....	.....	.....	.....	....	2	.....	.....	12	72
....	....	....	....	....	....	....	....	.....	.....	.....	....	1	.....	.....	7	73
4	....	....	....	5	....	....	....	.....	.....	.....	....	2	.....	.....	18	74
....	....	....	....	20	....	1	....	.....	.....	.....	....	.....	1	.....	13	75
56	....	....	....	11	....	....	1	1	1	1	....	....	.....	4	15	76
163	....	....	....	*13*	....	*3*	*1*	*1*	.....	.....	....	*1*	.....	*2*	*13*	*28*
46	....	1	....	4	....	....	....	.....	.....	.....	....	.....	.....	4	13	77
83	*1*	*4*	....	....	....	*2*	*1*	.....	*2*	.....	*1*	*2*	.....	*68*	*18*	*29*
32	....	....	....	....	....	....	....	1	.....	.....	....	1	.....	2	7	78
2	....	....	....	1	....	....	....	.....	.....	.....	....	1	.....	.....	6	79
....	....	....	....	....	....	....	....	.....	.....	.....	....	3	.....	.....	6	80
....	....	....	....	....	....	....	....	1	.....	.....	....	1	.....	.....	7	81
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	.....	*6*	*30*
....	....	....	....	....	....	....	....	12	4	1	....	12	.....	.....	147	52
928	**7**	**89**	**1**	**198**	**5**	**106**	**13**	**302**	**211**	**15**	**14**	**115**	**30**	**287**	**2049**	**51**
5	....	....	....	1	....	12	2	9	7	.....	1	9	.....	2	59	50
1	....	....	....	....	....	*1*	....	*2*	*2*	*1*	*1*	*9*	*3*	.....	*87*	*20*
7	....	*1*	....	....	....	....	....	*1*	*2*	.....	....	*3*	.....	*3*	*51*	*21*
120	1	12	1	17	....	9	2	28	22	1	3	12	3	21	213	51
1	....	2	....	....	....	....	....	.....	.....	.....	....	*1*	.....	*2*	*5*	*22*
95	....	*1*	....	*5*	....	*3*	*2*	*10*	*1*	*1*	*2*	*2*	*1*	*11*	*43*	*23*
....	....	....	....	....	....	....	....	.....	.....	.....	....	.....	.....	*1*	....	*28*
110	1	2	....	13	....	8	....	2	3	2	....	4	2	8	29	52
124	....	*6*	....	*6*	....	*1*	....	*3*	*1*	.....	....	*2*	.....	.....	*29*	*24*
6	4	3	....	....	1	22	1	10	8	1	....	17	1	5	154	53
1	....	*2*	....	....	....	*1*	*1*	.....	*1*	.....	....	*2*	.....	.....	*17*	*25*
48	....	10	....	16	1	14	1	32	9	4	2	16	6	96	153	54
15	....	4	....	14	1	7	....	8	4	1	....	3	2	61	63	55

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
SUFFOLK COUNTY—(*Concluded*)											
56 Shelter Island	1,064	1,155	15	...	10	17	....	....	8	....	...
57 Smithtown	7,073	4,988	75	3	65	132	4	1	39	94	1
58 Southampton (24)	6,491	8,262	132	4	94	329	13	3	48	1	...
26 Southampton, village	*2,509*	*3,092*	*99*	*1*	*73*	*239*	*16*	*2*	*25*	*2*	*1*
59 Southold	7,488	6,273	124	6	65	38	7	5	32	....	...
27 Greenport, village	*3,089*	*3,735*	*78*	*3*	*60*	*35*	*11*	*3*	*23*	....	...
Indian Reservation	*	161	.....	...	.....	.....	....	....	....	....	...
29 Bright Waters, village	.....	.....	*1*	...	*3*	.....	....	....	*2*	....	...
54 Central Islip State Hospital	.....	.....	.....	...	541	85	....	1	167	10	2
57 Kings Park State Hospital	.....	.....	.....	...	449	100	2	....	132	5	...
52 SULLIVAN COUNTY	33,808	**38,189**	**573**	**22**	**672**	**1,949**	**48**	**4**	**272**	**15**	**3**
50 Bethel	2,164	2,308	33	2	30	32	5	....	17	1	...
51 Callicoon	2,059	2,066	26	1	28	69	1	1	14	3	...
52 Cochecton	1,142	1,141	31	...	25	96	3	....	10	1	1
53 Delaware	1,842	1,915	20	1	33	118	1	....	20	....	...
54 Fallsburgh	2,782	4,860	82	1	43	84	7	....	18	1	...
23 Centerville Station, village	.....	*900*	*8*	...	*6*	*1*	....	....	*1*	....	...
55 Forestburg	545	429	3	1	1	2	....	....	1	....	...
56 Fremont	1,931	1,771	33	2	17	24	3	1	8	....	...
57 Highland	1,031	1,043	28	...	12	6	1	....	8	2	1
58 Liberty	3,330	3,944	66	4	123	523	8	1	22	1	...
20 Liberty, village	*2,072*	*2,395*	*30*	*1*	*97*	*543*	*1*	....	*18*	....	*1*
59 Lumberland	716	806	7	1	4	2	1	....	2	....	...
60 Mamakating	2,444	2,695	42	3	47	44	6	....	23	....	...
21 Wurtsboro, village	*478*	*409*	*7*	...	*15*	*1*	*1*	....	*12*	....	...
61 Neversink	1,743	1,861	25	1	30	41	3	....	21	2	...
62 Rockland	3,455	3,803	62	4	59	112	3	1	34	3	...
63 Thompson	2,255	2,810	27	...	32	127	1	....	11	....	...
22 Monticello, village	*1,941*	*2,132*	*31*	...	*55*	*111*	*1*	....	*25*	*1*	...
64 Tusten	878	901	12	...	15	13	2	....	7	....	...
53 TIOGA COUNTY	25,624	**25,549**	**406**	**11**	**423**	**543**	**35**	**18**	**269**	**16**	**5**
50 Barton	1,576	1,523	13	1	18	10	1	....	11	....	...
20 Waverly, village	*4,855*	*5,159*	*76*	*1*	*68*	*43*	*7*	*3*	*44*	*7*	*1*
51 Berkshire	846	875	11	1	5	27	....	....	4	....	...
52 Candor	2,174	2,147	34	1	27	32	2	3	17	2	2
21 Candor, village	*737*	*749*	*14*	...	*14*	*11*	*1*	....	*12*	*1*	...
53 Newark Valley	1,177	1,167	16	...	16	20	1	2	10	....	...
22 Newark Valley, village	*925*	*808*	*13*	...	*25*	*92*	....	....	*19*	....	...
54 Nichols	933	947	16	1	17	4	1	....	11	....	...
23 Nichols, village	*533*	*586*	*8*	...	*14*	.....	1	....	11	....	...
55 Owego	2,841	2,896	69	1	61	65	4	1	32	....	...
24 Owego, village	*4,633*	*4,570*	*5*	*2*	*94*	*92*	*7*	*7*	*55*	*3*	*1*
56 Richford	925	913	22	...	12	21	....	1	9	1	...
57 Spencer	960	552	12	2	9	4	1	....	6	2	1
25 Spencer, village	*569*	*653*	*18*	...	*15*	*6*	*1*	....	*12*	....	...
58 Tioga	1,940	2,004	27	1	28	116	8	1	16	....	...
54 TOMPKINS COUNTY	33,647	**36,535**	**678**	**22**	**588**	**549**	**48**	**7**	**356**	**23**	**5**
01 Ithaca, city	14,802	**16,750**	**353**	**13**	**273**	**228**	**18**	**2**	**153**	**18**	**3**
50 Caroline	1,646	1,676	27	3	34	31	6	....	25	1	...
51 Danby	1,235	1,230	18	...	19	23	2	....	14	....	...
52 Dryden	2,563	2,497	35	1	39	32	2	....	27	....	...
20 Dryden, village	*709*	*722*	*8*	...	*8*	*6*	....	....	*7*	....	...
21 Freeville, village	*318*	*337*	.....	...	*6*	*14*	*1*	....	*4*	....	...
53 Enfield	1,000	1,057	11	1	14	4	3	1	7	1	...
54 Groton	2,029	2,056	49	2	21	39	1	1	15	1	1
22 Groton, village	*1,260*	*1,445*	*38*	*1*	*29*	*85*	*3*	....	*14*	....	...
55 Ithaca	1,288	1,893	31	...	17	24	2	2	8	1	...
25 Cayuga Heights, village	.....	.....	*3*	...	*1*	*1*	....	....	*1*	....	...
56 Lansing	2,676	2,612	54	...	40	10	5	....	25	....	...

* Distributed by towns

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
....	....	....	....	2	....	2	....	.....	.....	.....	.....	.....	.....	13	10	56
5	....	5	....	.....	.....	1	....	11	6	2	....	6	1	14	51	57
216	....	11	....	75	....	5	....	7	2	.....	1	4	6	14	81	58
151	....	*16*	....	*49*	*2*	.....	.....	*8*	*3*	.....	*1*	*3*	*3*	*13*	*60*	*26*
18	1	9	....	.....	.....	4	....	1	1	.....	2	4	2	16	55	59
3	....	*3*	....	.....	.....	*16*	*4*	*6*	*3*	.....	*1*	*6*	.....	*7*	*46*	*27*
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*1*	.....	.....	*2*	*29*
1	....	1	....	.....	.....	.....	.....	73	62	.....	....	8	.....	.....	469	54
1	....	1	....	.....	.....	.....	.....	91	74	2	....	3	.....	.....	372	57
441	....	**21**	**1**	**168**	**2**	**12**	....	**1,162**	**211**	**67**	**4**	**33**	**2**	**63**	**416**	**52**
13	....	2	....	7	....	.....	.....	7	3	.....	....	1	.....	2	26	50
32	....	2	....	11	....	4	....	9	4	.....	1	3	.....	8	20	51
10	....	.....	....	41	....	.....	....	29	5	2	....	1	.....	13	18	52
105	....	.....	....	10	1	.....	....	3	3	.....	....	1	.....	.....	28	53
11	....	3	....	18	....	.....	....	45	7	4	....	2	.....	2	34	54
....	....	.....	.....	.....	.....	.....	.....	*1*	*4*	.....	.....	.....	.....	.....	*2*	*23*
1	....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	55
6	....	.....	....	13	....	.....	....	5	3	.....	....	.....	1	.....	13	56
1	....	.....	....	.....	.....	.....	.....	3	1	.....	....	.....	.....	.....	10	57
37	....	1	....	32	....	1	....	433	75	12	1	2	.....	6	45	58
74	....	*1*	....	*13*	....	*1*	....	*396*	*70*	*41*	....	*4*	.....	*17*	*22*	*20*
2	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	59
34	....	1	....	2	....	2	....	4	4	.....	....	5	.....	1	38	60
.....	....	*1*	....	.....	.....	.....	.....	.....	.....	.....	.....	*2*	.....	.....	*13*	*21*
26	....	.....	....	1	1	.....	....	10	1	1	....	1	.....	1	27	61
64	....	6	1	11	....	2	....	20	4	.....	1	6	.....	6	47	62
9	....	4	....	7	....	2	....	98	9	1	1	1	.....	6	21	63
3	....	.....	....	*2*	....	.....	....	*98*	*18*	*6*	....	*2*	*1*	*1*	*34*	*22*
13	....	.....	....	.....	.....	.....	....	.....	.....	.....	.....	2	.....	.....	13	64
336	**5**	**37**	**1**	**58**	**2**	**36**	**7**	**19**	**17**	**2**	**1**	**21**	**7**	**39**	**357**	**53**
5	1	1	....	.....	.....	.....	.....	1	2	.....	....	1	.....	3	14	50
14	....	*1*	....	*3*	*1*	*10*	*1*	*4*	.....	.....	....	*5*	*2*	*4*	*58*	*20*
26	....	.....	....	.....	.....	.....	.....	1	1	.....	....	.....	.....	.....	4	51
7	....	1	....	.....	.....	7	1	1	.....	1	....	2	.....	13	22	52
4	....	.....	....	.....	.....	.....	.....	.....	.....	*1*	....	.....	.....	*5*	*14*	*21*
11	1	3	....	5	1	.....	....	1	.....	.....	....	1	.....	.....	13	53
62	*1*	.....	....	*30*	.....	.....	.....	.....	*1*	.....	....	.....	.....	.....	*23*	*22*
3	....	.....	....	.....	.....	.....	.....	1	2	.....	....	1	.....	.....	14	54
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*1*	.....	*13*	*23*
41	1	7	....	10	....	5	1	2	1	.....	....	1	1	.....	56	55
50	*1*	*16*	*1*	.....	.....	*12*	*3*	*4*	*7*	.....	*1*	*6*	*2*	*7*	*72*	*24*
13	....	1	....	.....	.....	2	1	.....	.....	.....	....	.....	.....	4	11	56
....	....	1	....	.....	.....	.....	.....	1	1	.....	....	1	.....	.....	6	57
.....	.....	.....	*5*	.....	.....	.....	.....	*1*	*1*	.....	....	*2*	.....	.....	*12*	*25*
100	....	6	....	5	....	.....	....	2	1	.....	....	1	1	3	25	58
148	**1**	**14**	....	**85**	**1**	**7**	....	**78**	**28**	**7**	**3**	**50**	**5**	**187**	**495**	**54**
20	....	**9**	....	**26**	....	**3**	....	**51**	**9**	**4**	**3**	**29**	**1**	**97**	**228**	**01**
15	....	1	....	5	....	.....	....	.....	.....	.....	....	4	1	9	29	50
5	....	.....	....	.....	.....	1	....	1	.....	.....	....	2	.....	16	17	51
30	....	.....	....	1	....	.....	....	1	.....	.....	....	.....	.....	.....	39	52
3	....	.....	....	.....	.....	.....	.....	*1*	.....	.....	....	*1*	.....	*2*	*7*	*20*
8	....	.....	....	*4*	.....	.....	.....	*2*	.....	.....	....	.....	.....	.....	*6*	*21*
.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	....	.....	1	2	13	53
18	....	.....	....	9	....	.....	....	2	2	.....	....	2	.....	9	16	54
27	....	*1*	....	*30*	.....	.....	.....	*4*	*2*	.....	....	*2*	.....	*23*	*25*	*22*
9	1	.....	....	8	1	3	....	1	1	.....	....	.....	.....	2	14	55
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*1*	*1*	*25*
1	....	3	....	.....	.....	.....	.....	4	1	2	....	1	1	.....	37	56

'n U. S. census.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census April 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
TOMPKINS COUNTY—(*Concluded*)											
57 Newfield	1,155	1,306	23	1	20	3	2	....	10	....	...
23 Newfield, village	*354*	*341*	*6*	...	*6*	.....	.....	.....	*6*	....	...
58 Ulysses	1,424	1,432	17	...	42	29	1	1	28	....	...
24 Trumansburg, village	*1,188*	*1,181*	*5*	...	*19*	*20*	*2*	....	*12*	*1*	*1*
55 ULSTER COUNTY	**91,769**	**85,367**	**1,358**	**63**	**1,290**	**928**	**120**	**35**	**643**	**68**	**9**
01 Kingston, city	**25,908**	**26,354**	**480**	**21**	**520**	**290**	**45**	**18**	**216**	**31**	**3**
50 Denning	615	531	6	...	6	1	.....	.....	6	....	...
51 Esopus	3,987	4,297	57	8	55	43	5	....	34	10	...
20 Rijton, village	*745*	*346*	*2*	...	*3*	.....	*1*	.....	.....	....	...
52 Gardiner	2,779	1,328	31	3	17	40	3	1	8	....	...
53 Hardenburg	598	565	12	...	5	4	1	....	4	....	...
54 Hurley	1,734	1,189	11	1	15	3	2	....	10	2	...
55 Kingston	343	323	2	...	1	1	.....	.....	.....	1	...
56 Lloyd	2,803	2,865	42	2	44	38	4	2	27	1	1
57 Marbletown	4,713	2,709	28	1	33	18	5	....	15	1	...
58 Marlborough	2,921	3,513	59	1	34	17	5	3	14	1	...
21 Marlboro, village	*920*	*795*	*19*	*1*	*12*	*6*	*2*	....	*5*	....	...
59 New Paltz	1,795	1,308	22	3	35	9	3	....	24	1	1
22 New Paltz, village	*1,230*	*1,261*	*13*	*1*	*27*	*17*	*2*	....	*13*	*1*	*1*
60 Olive	4,497	2,921	23	1	28	10	6	....	14	5	...
61 Plattekill	1,879	1,928	33	...	21	9	1	1	14	....	...
62 Rochester	2,760	2,715	45	1	32	38	1	1	18	5	2
63 Rosendale	2,592	2,082	13	...	34	11	1	....	21	....	...
23 Rosendale, village	*1,125*	*804*	*1*	*1*	*5*	*3*	.....	.....	*3*	*1*	...
64 Saugerties	5,703	5,366	106	4	60	82	6	1	36	4	1
24 Saugerties, village	*3,929*	*4,490*	*68*	*3*	*67*	*162*	*6*	*4*	*33*	*1*	...
65 Shandaken	2,240	2,090	24	...	31	21	1	....	16	....	...
25 Pine Hill, village	*417*	*646*	*4*	...	*6*	.....	*1*	....	*3*	....	...
66 Shawangunk	2,548	2,392	57	...	34	18	5	....	22	....	...
67 Ulster	3,554	3,437	57	6	32	3	3	3	14	1	...
68 Wawarsing	4,673	4,434	66	3	53	27	5	1	27	....	...
26 Ellenville, village	*3,114*	*3,073*	*48*	*1*	*53*	*40*	*5*	....	*28*	*1*	...
69 Woodstock	1,647	1,605	29	1	27	17	1	....	18	1	...
56 WARREN COUNTY	**32,223**	**32,977**	**587**	**40**	**507**	**513**	**51**	**21**	**247**	**20**	**3**
01 Glens Falls, city	**15,243**	**16,323**	**298**	**24**	**279**	**359**	**28**	**13**	**123**	**9**	**2**
50 Bolton	1,518	1,397	18	2	20	21	.....	.....	12	....	...
51 Caldwell	850	892	19	...	8	12	1	....	6	1	...
20 Lake George, village	*632*	*750*	*10*	*1*	*8*	*4*	.....	.....	*2*	....	...
52 Chester	1,721	1,630	25	1	22	12	3	1	15	5	...
53 Hague	1,043	943	20	1	14	2	1	1	6	....	...
54 Horicon	1,001	1,056	25	...	9	5	....	2	6	1	...
55 Johnsburg	2,315	2,358	46	2	39	7	5	2	23	2	...
56 Luzerne	1,185	1,070	19	1	16	4	3	....	8	....	...
57 Queensbury	2,667	2,721	45	3	33	31	5	1	17	....	...
58 Stony Creek	858	719	11	1	10	22	.....	.....	4	....	...
59 Thurman	805	807	15	1	10	2	2	....	5	....	...
60 Warrensburg	2,385	2,311	36	3	39	32	3	1	20	2	1
57 WASHINGTON COUNTY	**47,778**	**46,955**	**885**	**37**	**662**	**820**	**95**	**13**	**370**	**26**	**4**
50 Argyle	1,575	1,451	27	1	39	12	3	1	28	1	...
20 Argyle, village	*231*	*223*	*3*	...	*11*	*1*	....	*1*	*8*	....	...
51 Cambridge	1,222	1,179	11	...	13	8	1	....	10	....	...
21 Cambridge, village (65)	*1,528*	*1,727*	*15*	...	*19*	*51*	*2*	*1*	*10*	....	...
52 Dresden	582	514	13	...	10	1	.....	.....	7	....	...
53 Easton	1,772	1,831	29	1	18	3	4	....	10	1	...
22 Greenwich, village (57)	*2,314*	*2,315*	*31*	*5*	*22*	*10*	*1*	....	*19*	....	...
54 Fort Ann	1,800	1,866	39	1	21	51	4	1	11	2	1
23 Fort Ann, village	*436*	*436*	*4*	...	*9*	*44*	.....	.....	7	*2*	*1*
55 Fort Edward	1,978	2,069	52	2	18	72	2	....	6	2	..
24 Fort Edward, village	*3,762*	*3,662*	*84*	*5*	*59*	*48*	*13*	*2*	*27*	*1*	..
56 Granville	2,514	2,491	28	4	27	5	6	....	13	....	..

District numbers, population (U. S. Census, April 25, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 10	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
2	....	....	....	....	....	....	....	1	2	....	....	3	1	.....	14	57
....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	*6*	*23*
8	....	....	....	1	....	....	....	5	10	....	....	5	.....	15	27	58
2	....	....	....	*1*	....	....	....	*4*	*1*	*1*	....	*1*	.....	*11*	*16*	*24*
194	**1**	**55**	....	**122**	**6**	**43**	**5**	**125**	**116**	**2**	**9**	**75**	**27**	**319**	**1042**	**55**
49	....	**16**	....	**4**	**2**	**18**	**2**	**33**	**53**	**1**	**4**	**28**	**7**	**138**	**421**	**01**
1	....	....	....	....	....	....	....	....	....	....	....	1	.....	.....	5	50
3	....	5	....	....	....	2	1	7	4	....	....	4	2	16	44	51
....	....	....	....	....	....	....	*1*	....	....	....	....	....	....	.....	*2*	*20*
38	....	....	....	....	....	....	....	2	2	....	....	....	2	.....	13	52
4	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	5	53
....	....	....	....	....	....	....	....	1	1	....	....	1	.....	.....	13	54
....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	1	55
1	....	11	....	2	2	3	1	4	1	....	....	4	1	16	34	56
7	....	....	....	....	....	....	....	1	1	....	1	1	.....	9	30	57
3	....	6	....	....	....	4	....	3	....	....	....	3	2	.....	29	58
2	....	*2*	....	....	....	....	....	*2*	*3*	....	....	*1*	*1*	.....	*7*	*21*
....	....	1	....	....	....	....	....	2	1	....	1	3	1	5	28	59
1	....	....	....	....	....	....	....	*5*	*1*	....	....	*4*	.....	*10*	21	*22*
1	....	....	....	....	....	....	....	4	2	....	....	1	2	.....	23	60
2	....	....	....	1	....	....	....	4	4	....	1	2	.....	2	14	61
9	....	1	....	9	....	1	....	8	4	....	....	2	.....	5	24	62
8	....	....	....	....	....	....	....	3	....	....	....	1	.....	.....	33	63
1	....	....	....	....	....	....	....	....	....	....	....	....	.....	*1*	*5*	*23*
8	....	....	....	30	1	3	....	12	10	....	....	3	2	25	43	64
7	....	*6*	....	*58*	*1*	*2*	....	*12*	*10*	*1*	*1*	*1*	*2*	*75*	*52*	*24*
14	....	2	....	....	....	4	....	1	2	....	....	2	1	.....	26	65
....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	*6*	*25*
11	....	....	....	....	....	1	....	*3*	*2*	....	....	*3*	*1*	*3*	*28*	*66*
2	....	....	....	....	....	....	....	....	2	....	1	....	2	.....	27	67
4	....	3	....	6	....	1	....	10	5	....	....	3	1	3	44	68
16	*1*	....	....	*12*	....	....	....	7	*5*	....	....	*6*	.....	*4*	*41*	*26*
2	....	2	....	....	....	4	....	1	3	....	....	1	.....	7	23	69
207	....	**66**	**1**	**82**	**1**	**59**	**6**	**57**	**31**	**7**	**7**	**36**	**7**	**15**	**415**	**56**
174	....	**54**	**1**	**29**	....	**43**	**4**	**40**	**15**	**5**	**6**	**22**	**5**	**5**	**224**	**01**
15	....	2	....	....	....	....	....	....	1	....	....	....	.....	4	19	50
2	....	....	....	9	....	....	....	....	....	....	....	....	.....	.....	8	51
....	....	....	....	....	....	*1*	....	*3*	*2*	....	....	*1*	.....	.....	*5*	*20*
....	....	....	....	....	....	1	....	3	1	....	....	....	1	3	20	52
1	....	....	....	....	....	1	....	....	....	....	....	1	.....	.....	13	53
....	....	....	....	....	....	4	1	....	....	....	....	1	1	.....	6	54
....	....	....	....	....	....	....	....	5	3	....	....	3	.....	.....	33	55
1	....	....	....	....	....	2	....	....	1	1	....	....	.....	.....	15	56
11	....	10	....	6	1	2	....	2	5	....	....	2	.....	.....	25	57
1	....	....	....	19	....	....	....	2	2	....	....	....	.....	.....	8	58
....	....	....	....	....	....	2	....	....	....	....	....	2	.....	.....	8	59
2	....	....	....	19	....	3	1	2	1	1	1	4	.....	3	31	60
298	**3**	**126**	....	**128**	**1**	**101**	**6**	**49**	**32**	**1**	**2**	**44**	**18**	**91**	**552**	**57**
2	....	7	....	2	....	....	....	....	....	....	....	....	.....	.....	39	50
....	....	....	....	....	....	*1*	*1*	....	....	....	....	*2*	.....	.....	*8*	*20*
1	....	2	....	5	....	....	....	....	....	....	....	....	.....	.....	13	51
1	*1*	....	....	*31*	....	....	....	*6*	*1*	....	*1*	*2*	.....	*13*	*14*	*21*
....	....	....	....	....	....	1	....	....	....	....	....	....	.....	.....	10	52
....	....	2	....	....	....	....	....	....	....	....	....	4	1	.....	13	53
2	....	*2*	....	....	....	*1*	....	*1*	*1*	....	....	*1*	.....	*4*	*20*	*22*
23	....	14	....	....	....	....	....	2	....	....	....	....	1	10	19	54
25	....	*17*	....	....	....	....	....	....	....	....	....	*1*	.....	.....	*7*	*23*
2	....	37	....	22	....	3	....	2	3	....	....	....	2	4	13	55
4	....	*12*	....	*3*	....	*5*	....	*7*	*3*	*1*	....	*4*	*4*	*15*	*48*	*24*
....	....	....	....	....	....	3	....	**2**	1	....	....	1	1	.....	24	56

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (still-births excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
WASHINGTON COUNTY—(*Concluded*)											
25 Granville, village	*3,920*	*3,890*	*81*	*1*	*44*	*142*	*9*	....	*15*	*10*	*1*
57 Greenwich (22)	2,274	2,293	61	...	35	12	2	2	22	....	...
58 Hampton	645	671	12	1	11	.....	4	1	3	....	...
59 Hartford	1,216	1,171	15	1	16	25	4	....	11	....	...
60 Hebron	1,505	1,356	20	...	19	1	....	....	16	....	...
61 Jackson	985	988	15	1	13	17	1	....	9	....	...
62 Kingsbury	1,891	1,703	31	...	19	16	4	....	12	....	...
26 Hudson Falls, village	*5,189*	*5,585*	*110*	*5*	*65*	*32*	*12*	*1*	*32*	*2*	...
63 Putnam	504	579	15	1	11	5	2	1	6	....	...
64 Salem	1,530	1,377	20	1	31	112	4	....	20	....	...
27 Salem, village	*1,250*	*1,096*	*21*	...	*25*	*17*	*3*	....	*15*	....	...
65 White Creek (21)	1,286	1,020	17	...	17	33	1	....	13	....	...
66 Whitehall	952	796	11	2	8	22	2	....	4	1	...
28 Whitehall, village	*4,917*	*4,666*	*120*	*5*	*80*	*80*	*11*	*2*	*36*	*4*	*1*
54 Great Meadow Prison			....	...	2	....	....	....	....	....	....
58 WAYNE COUNTY	**50,179**	**53,476**	**911**	**30**	**758**	**1,736**	**58**	**28**	**437**	**43**	**2**
50 Arcadia	2,445	1,716	34	3	30	24	2	1	23	5	1
20 Newark, village	*6,227*	*6,468*	*107*	*2*	*81*	*80*	*5*	*1*	*45*	*1*	...
51 Butler	1,450	1,568	21	4	21	50	1	....	14	1	...
21 Wolcott, village (64)	*1,216*	*1,346*	*16*	...	*30*	*140*	*2*	*1*	*15*	....	...
52 Galen	1,935	1,944	25	...	35	77	1	1	18	....	...
22 Clyde, village	*2,695*	*2,699*	*71*	...	*39*	*221*	*9*	*1*	*18*	*1*	...
53 Huron	1,531	1,681	29	1	21	119	1	1	13	5	...
54 Lyons	1,453	1,453	29	...	36	18	2	1	23	12	1
23 Lyons, village	*4,460*	*4,742*	*100*	...	*73*	*60*	*8*	*5*	*35*	*5*	...
55 Macedon	1,819	1,326	30	1	23	23	2	....	11	4	...
24 Macedon, village	*536*	*1,147*	*5*	...	*7*	*3*	....	....	*5*	....	...
56 Marion	2,102	2,435	30	1	28	25	5	....	18	5	...
57 Ontario	2,673	2,934	46	1	34	201	1	3	17	1	...
58 Palmyra	1,901	1,728	30	2	19	16	1	1	13	....	...
25 Palmyra, village	*2,263*	*2,469*	*29*	*2*	*27*	*30*	....	*2*	*21*	*1*	...
59 Rose	1,883	2,243	42	2	27	52	1	....	21	....	...
60 Savannah	1,065	1,108	14	2	21	36	1	....	12	....	...
26 Savannah, village	*521*	*531*	*10*	...	*11*	*19*	....	....	*7*	....	...
61 Sodus	4,857	5,757	94	4	76	43	7	3	42	1	...
62 Walworth	2,187	2,308	39	3	22	176	3	2	11	....	...
63 Williamson	3,060	3,762	68	1	47	159	4	3	32	....	...
64 Wolcott (21)	1,439	1,576	31	1	31	57	2	1	18	1	...
27 Red Creek, village	*457*	*525*	*11*	...	*7*	*99*	....	*1*	*5*	....	...
20 Newark Custodial Asylum for Women			....	...	12	8	....	....	....	....	....
59 WESTCHESTER COUNTY	**283,055**	**321,713**	**7,676**	**231**	**4,191**	**7,895**	**610**	**258**	**1481**	**87**	**16**
01 Peekskill, village	15,245	**15,502**	**289**	**11**	**224**	**671**	**30**	**3**	**88**	**2**	...
02 White Plains, city	15,949	**19,287**	**473**	**22**	**258**	**502**	**33**	**12**	**86**	**5**	...
03 Mount Vernon, city	30,919	**37,583**	**902**	**32**	**419**	**1,276**	**50**	**22**	**176**	**20**	**4**
04 New Rochelle, city	28,867	**31,758**	**704**	**29**	**358**	**873**	**66**	**14**	**113**	**6**	**1**
05 Ossining, village	11,480	**10,326**	**211**	**2**	**165**	**121**	**19**	**9**	**66**	**3**	...
06 Port Chester, village	12,809	**15,129**	**568**	**16**	**221**	**280**	**50**	**18**	**55**	**6**	...
07 Yonkers, city	79,803	**90,948**	**2,510**	**55**	**1,202**	**1,609**	**209**	**101**	**330**	**16**	**6**
50 Bedford	4,363	4,777	81	...	43	96	4	4	20	....	...
20 Mt. Kisco, village (58)	*2,802*	*2,902*	*154*	*9*	*47*	*141*	*7*	*4*	*14*	*2*	*1*
51 Cortlandt	5,204	5,045	97	8	69	130	6	4	28	....	...
21 Croton-on-Hudson, village	*1,806*	*2,243*	*25*	*2*	*19*	*14*	*3*	....	*10*	....	...
52 Eastchester	1,837	2,565	48	1	21	25	1	2	11	....	...
22 Bronxville, village	*1,863*	*2,240*	*86*	*2*	*31*	*114*	*4*	*1*	*10*	*1*	*1*
23 Tuckahoe, village	*2,722*	*2,753*	*105*	*1*	*40*	*99*	*12*	*7*	*10*	*2*	*1*
53 Greenburgh	4,685	4,016	61	...	43	48	4	1	16	2	...
24 Ardsley, village	*537*	*442*	*11*	...	*3*	*3*	....	....	*2*	....	...
25 Dobbs Ferry, village	*3,455*	*4,030*	*90*	*5*	*62*	*45*	*9*	*5*	*21*	*1*	*1*

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
47	....	*8*	....	*13*	....	*53*	*1*	*7*	*6*	.....	*1*	*4*	*1*	*4*	*30*	*25*
1	....	2	....	....	....	4	1	4	.....	.....	.....	.....	.....	1	34	57
.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	1	.....	8	58
21	....	3	....	....	....	....	....	1	.....	.....	.....	2	.....	.....	14	59
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	15	60
7	.....	.....	.....	7	....	1	....	1	1	.....	.....	.....	.....	1	12	61
8	.....	.....	.....	.....	.....	6	....	.....	1	.....	.....	2	1	2	15	62
1	....	*17*	....	*1*	....	*5*	....	*4*	*3*	.....	.....	*2*	*3*	*2*	*57*	*26*
5	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	10	63
76	....	1	....	24	....	....	....	2	1	.....	.....	2	.....	9	28	64
11	....	.....	.....	*1*	....	....	....	*2*	*3*	.....	.....	*2*	.....	*3*	*20*	*27*
12	....	.....	.....	18	....	.....	....	1	1	.....	.....	4	.....	2	12	65
13	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	6	66
35	....	*2*	....	*1*	*1*	*18*	*3*	*7*	*5*	.....	.....	*6*	*3*	*13*	*61*	*28*
....	....	....	....	....	....	....	....	.....	.....	.....	.....	....	.....	.....	2	54
765	**5**	**117**	....	**397**	**5**	**22**	**1**	**72**	**36**	**18**	**7**	**69**	**10**	**302**	**623**	**58**
2	....	.....	.....	9	....	.....	....	5	1	3	1	3	.....	.....	24	50
19	....	*1*	....	*10*	....	*1*	*1*	7	*3*	*5*	*2*	*11*	*1*	*36*	*63*	*20*
30	1	2	....	13	....	.....	....	.....	.....	1	.....	.....	.....	3	20	51
113	....	*1*	....	*14*	....	.....	....	*3*	*3*	*1*	*1*	*5*	.....	*8*	*21*	*21*
58	....	6	....	9	....	.....	....	3	2	.....	.....	2	.....	1	31	52
139	....	*50*	....	*8*	*1*	*2*	....	*3*	*2*	.....	*1*	*3*	*1*	*18*	*31*	*22*
58	....	.....	.....	40	....	1	....	.....	.....	.....	.....	3	.....	15	18	53
5	.....	.....	.....	.....	1	.....	....	1	1	.....	.....	5	.....	.....	28	54
46	*2*	*2*	.....	.....	.....	.....	.....	*5*	*2*	.....	*1*	*7*	*5*	*2*	*56*	*23*
10	....	6	....	2	1	.....	....	.....	2	.....	.....	2	.....	1	18	55
....	....	*2*	....	.....	.....	.....	.....	*1*	.....	.....	.....	*1*	.....	.....	*6*	*24*
2	....	1	....	11	....	2	....	1	1	.....	.....	1	1	3	25	56
66	1	3	....	12	....	6	....	8	2	1	.....	....	1	104	30	57
1	....	4	....	2	.....	.....	....	4	1	.....	1	3	.....	5	14	58
1	....	*4*	....	*12*	.....	.....	....	*1*	*1*	*1*	.....	*4*	.....	*10*	*22*	*25*
14	....	1	....	32	.....	.....	....	2	1	1	....	3	.....	2	23	59
12	....	.....	.....	16	....	2	....	2	1	.....	.....	4	.....	4	16	60
8	....	*1*	....	*1*	....	*2*	....	*5*	*1*	.....	.....	*1*	.....	*2*	*9*	*26*
3	....	2	....	32	.....	.....	....	4	2	.....	.....	4	1	1	69	61
72	....	15	....	73	....	2	....	1	.....	.....	.....	1	.....	13	21	62
2	....	4	....	73	....	3	....	12	5	2	....	2	.....	63	40	63
38	1	4	....	8	1	.....	.....	.....	1	.....	.....	3	.....	6	25	64
66	....	*8*	....	*20*	*1*	.....	.....	.....	.....	.....	.....	*1*	.....	*5*	*5*	*27*
....	....	....	....	....	....	1	....	4	4	3	....	....	.....	.....	8	20
2137	**9**	**459**	**7**	**1223**	**23**	**626**	**47**	**430**	**340**	**37**	**77**	**279**	**170**	**2,896**	**3223**	**59**
125	....	**12**	....	**153**	**1**	**40**	....	**30**	**19**	**7**	**7**	**21**	**11**	**302**	**165**	**02**
184	**1**	**23**	....	**41**	....	**27**	**3**	**25**	**13**	.....	**8**	**22**	**7**	**197**	**204**	**02**
318	**3**	**80**	....	**257**	**2**	**98**	**2**	**32**	**20**	**4**	**5**	**27**	**12**	**467**	**344**	**03**
238	....	**30**	....	**84**	**2**	**20**	**1**	**34**	**11**	**1**	**5**	**24**	**14**	**460**	**300**	**04**
36	....	**9**	**1**	**22**	....	**10**	**2**	**25**	**12**	**2**	**4**	**6**	**3**	**14**	**137**	**05**
87	....	**11**	....	**53**	**4**	**17**	**2**	**22**	**13**	**4**	**5**	**8**	**8**	**80**	**181**	**06**
549	**1**	**223**	**6**	**105**	**6**	**270**	**24**	**123**	**118**	.....	**25**	**59**	**74**	**323**	**883**	**07**
16	....	1	....	58	....	2	1	3	3	1	....	3	.....	15	36	50
5	....	.....	.....	*118*	.....	.....	.....	*4*	*2*	.....	*1*	*3*	.....	*12*	*40*	*20*
25	....	.....	.....	20	....	24	1	9	1	3	2	6	1	49	58	51
1	....	*1*	....	*4*	....	*1*	....	*1*	*2*	.....	.....	*1*	*2*	*6*	*14*	*21*
4	....	1	....	1	....	6	1	4	3	.....	.....	3	1	9	13	52
23	....	*1*	....	*19*	....	*1*	....	*1*	.....	.....	.....	*1*	.....	*68*	*29*	*22*
12	....	*3*	....	*11*	....	*45*	*3*	*8*	*3*	.....	*1*	*3*	*4*	*18*	*25*	*23*
18	....	8	....	1	....	3	....	8	6	1	1	5	1	7	30	53
....	....	.....	.....	*1*	.....	*1*	....	*1*	*1*	.....	.....	....	.....	.....	*2*	*24*
2	....	*9*	....	....	....	*4*	*1*	*4*	*3*	.....	*1*	*1*	.....	*25*	*55*	*25*

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (stillbirths excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
WESTCHESTER COUNTY—(*Concluded*)											
26 Hastings-on-Hudson, village	*4,552*	*5,461*	*171*	*5*	*55*	*177*	*10*	*6*	*22*	*3*	...
27 Irvington, village	*2,319*	*2,379*	*26*	...	*15*	*14*	*2*	*1*	*5*	...	...
28 Tarrytown, village	*5,600*	*5,752*	*112*	*5*	*84*	*76*	*17*	*4*	*38*	...	...
39 Elmsford, village	.....	*1,380*	*31*	*1*	*13*	*20*	*3*	*2*	*3*	*2*	...
54 Harrison	4,226	5,081	120	2	46	117	9	5	12	2	...
55 Lewisboro	1,127	1,507	15	...	18	33	3	1	8	...	...
56 Mamaroneck	230	1,339	26	1	19	28	1	3	10	...	...
29 Larchmont, village	*1,958*	*2,060*	*23*	*1*	*22*	*117*	*1*	*2*	*14*	...	...
30 Mamaroneck, village (64)	*5,699*	*7,290*	*130*	*1*	*105*	*313*	*11*	*7*	*42*	*7*	*1*
57 Mt. Pleasant	3,789	5,596	76	1	290	64	9	2	122	...	...
31 Briarcliff Manor, village (61)	*950*	*1,221*	*11*	...	*7*	*18*	*1*	...	*4*	*1*	...
32 North Tarrytown, village	*5,421*	*4,877*	*187*	*5*	*60*	*89*	*15*	*7*	*15*	...	...
33 Pleasantville, village	*2,207*	*2,464*	*31*	*1*	*24*	*104*	*2*	...	*13*	...	...
34 Hillsdale, village	*423*	*	.....	...	.....	.....	.....	.....	.....	.....	...
58 Newcastle (20)	2,037	2,528	26	1	25	43	1	1	14	1	...
59 North Castle	1,522	2,484	39	1	18	41	2	...	9	...	...
60 North Salem	1,258	1,181	13	...	19	48	1	1	11	...	...
61 Ossining (31)	421	673	3	...	3	7	...	...	1	1	...
(62 Pelham)	154	†	.....	...	.....	.....	.....	.....	.....	.....	...
35 North Pelham, village	*1,311*	*1,874*	*39*	...	*17*	*52*	*1*	*1*	*7*	...	...
36 Pelham, village	*681*	*793*	*5*	...	*5*	*78*	...	...	*2*	...	...
37 Pelham Manor, village	*852*	*1,115*	*16*	*1*	*6*	*49*	*1*	...	*5*	...	...
63 Poundridge	725	643	8	1	13	2	1	...	9	...	...
64 Rye (30)	594	809	18	1	7	8	...	1	3	...	...
38 Rye, village	*3,964*	*5,339*	*75*	*2*	*37*	*109*	*5*	*5*	*20*	*1*	...
40 Scarsdale	1,300	2,717	20	1	19	146	1	...	14	3	...
66 Somers	1,228	1,173	17	1	12	32	2	2	5	...	...
67 White Plains (02)	1,141	‡	.....	...	.....	.....	.....	.....	.....	.....	...
68 Yorktown	3,020	2,431	30	3	24	64	1	...	17	...	...
05 Sing Sing Prison	.....	.....	.....	...	12	7	...	...	...	...	...
50 State Reformatory for Women, Bedford	.....	.....	3	...	3	.....	3	...	...	...	...
60 WYOMING COUNTY	**31,880**	**33,028**	**667**	**23**	**423**	**317**	**43**	**11**	**241**	**2**	...
50 Arcade	837	911	24	1	12	6	1	...	8	...	...
20 Arcade, village	*1,294*	*1,568*	*30*	...	*21*	*10*	*1*	*1*	*11*	...	...
51 Attica	880	898	22	...	7	.....	1	...	3	...	...
21 Attica, village	*1,869*	*2,013*	*35*	...	*32*	*3*	*3*	...	*26*	...	...
52 Bennington	1,742	1,757	37	...	16	5	2	...	11	...	...
53 Castile	1,102	1,193	22	...	15	10	1	1	7	...	...
22 Castile, village	*1,040*	*962*	*17*	*1*	*25*	*2*	*2*	...	*16*	...	...
23 Perry, village (61)	*4,388*	*5,009*	*114*	*6*	*64*	*99*	*12*	*1*	*33*	...	...
54 Covington	923	981	18	...	9	6	...	...	6	...	...
55 Eagle	1,141	1,189	25	3	12	3	...	...	8	...	...
56 Gainesville	1,389	1,242	28	...	4	1	...	...	3	...	...
24 Gainesville, village	*327*	*340*	*6*	...	*4*	*2*	*1*	...	*2*	...	...
25 Silver Springs, village	*974*	*893*	*18*	...	*11*	*44*	*1*	*3*	*2*	...	...
57 Genesee Falls	615	661	12	1	9	2	1	...	5	...	...
58 Java	1,633	1,636	29	2	14	11	1	...	10	...	...
59 Middlebury	1,395	1,485	14	1	3	3	...	1	2	...	...
60 Orangeville	952	905	22	1	19	6	2	...	12	...	...
61 Perry (23)	1,236	1,117	25	2	16	2	...	...	9	1	...
62 Pike	772	732	16	2	10	10	1	...	6	...	...
26 Pike, village	*422*	*344*	*10*	...	*7*	*15*	*1*	...	*4*	...	...
63 Sheldon	1,713	1,752	29	1	24	26	4	...	12	...	...
64 Warsaw	1,102	1,121	19	2	10	1	1	...	6	...	...
27 Warsaw, village	*3,206*	*3,424*	*68*	...	*67*	*49*	*7*	*3*	*30*	*1*	...
65 Wethersfield	928	895	23	...	7	1	...	1	4	...	...
28 Wyoming village	.....	.....	*4*	...	*5*	.....	.....	.....	*5*	...	...

* Disorganized; population included in town. † Disorganized; included

District numbers, population (U. S. Census, April 15, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Continued)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
51	....	4	....	8	....	2	....	15	3	1	2	3	3	93	44	26
2	....	2	....	....	....	3	....	5	2	....	1	1	....	2	11	27
5	....	3	....	28	1	....	....	8	4	....	....	4	3	31	72	28
3	....	2	....	....	....	....	....	2	....	1	1	....	2	10	10	39
8	....	8	....	28	1	2	....	5	2	2	1	2	2	62	38	54
4	....	....	....	5	....	....	....	1	3	1	....	2	1	22	12	55
10	....	2	....	8	2	....	....	2	1	1	1	....	....	5	15	56
23	....	2	....	24	....	....	....	....	....	1	....	1	....	67	21	29
127	2	2	....	77	2	20	....	13	9	2	1	9	9	65	72	30
4	....	3	....	7	....	3	....	5	67	1	2	47	1	41	173	57
10	....	3	....	1	....	1	....	1	....	....	....	....	....	1	7	32
15	1	3	....	12	....	4	2	4	6	....	2	3	4	51	42	32
11	....	1	....	9	....	1	....	6	4	....	....	1	....	76	19	33
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	34
12	....	1	....	4	....	....	....	3	....	....	....	4	....	22	21	58
3	....	....	....	4	....	5	1	3	....	1	....	....	....	25	17	59
25	....	....	....	5	....	2	....	2	1	1	....	1	....	13	17	60
3	....	2	....	....	....	....	....	1	....	....	....	2	....	....	1	61
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	62
21	....	....	....	11	....	1	1	2	1	....	....	2	1	17	12	35
52	....	....	....	8	....	....	....	....	1	....	....	1	....	18	3	36
30	....	....	....	....	....	....	....	3	....	....	....	1	....	16	5	37
....	....	....	....	....	....	....	....	1	1	....	....	1	....	1	11	63
2	....	....	....	3	....	....	....	....	....	....	1	....	....	3	6	64
35	....	8	....	12	1	4	2	5	1	....	....	1	5	44	27	38
21	....	1	....	7	1	....	....	1	2	....	....	....	....	113	16	40
12	1	....	....	4	....	....	....	3	1	1	....	....	1	12	9	66
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	67
5	....	....	....	10	....	9	....	5	1	1	....	....	....	34	23	68
....	....	....	....	....	....	....	....	7	1	....	1	....	....	....	10	05
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	50
92	....	**18**	....	**85**	....	**8**	**2**	**24**	**11**	**5**	**8**	**47**	**7**	**83**	**348**	**60**
....	....	5	....	....	....	....	....	....	....	....	....	1	....	1	11	50
....	....	1	....	2	....	3	1	....	....	....	....	1	....	4	19	20
....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	6	51
....	....	....	....	....	....	....	....	....	1	....	....	6	1	3	24	21
....	....	....	....	3	....	....	....	2	1	....	....	2	1	....	12	52
7	....	....	....	2	....	....	....	1	1	....	....	1	1	....	12	53
1	....	....	....	1	....	....	....	....	1	....	....	....	....	....	24	22
....	....	3	....	53	....	1	....	5	2	....	....	6	2	37	54	23
....	....	2	....	....	....	....	....	3	....	....	1	....	....	1	8	54
2	....	....	....	....	....	....	....	....	....	....	....	2	....	1	10	55
1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4	56
....	....	1	....	....	....	....	....	1	1	....	....	....	....	....	3	24
40	....	....	....	1	....	2	1	....	....	1	1	....	1	....	8	25
1	....	....	....	....	....	....	....	1	....	....	....	....	....	....	9	57
....	....	....	....	3	....	....	....	....	....	....	....	3	....	8	11	58
1	....	....	....	2	....	....	....	....	....	....	....	....	....	....	3	59
3	....	....	....	1	....	....	....	1	1	....	....	2	....	1	16	60
1	....	....	....	....	....	....	....	....	....	....	....	2	....	....	14	61
....	....	....	....	3	....	....	....	1	1	....	1	2	....	6	6	62
3	....	....	....	7	....	....	....	1	....	....	....	....	....	4	7	26
25	....	....	....	....	....	....	....	1	....	....	....	3	1	....	20	63
....	....	1	....	....	....	....	....	....	....	....	....	2	....	....	8	64
6	....	5	....	7	....	2	....	7	2	4	4	10	....	17	51	27
1	....	....	....	....	....	....	....	....	....	....	1	1	....	....	5	65
....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	3	28

in village of Pelham Manor. ‡ Included in city of White Plains.

Table 17 — STATE OF NEW YORK (exclusive of New York city): *Census, June 1, 1915), births, stillbirths and cases and deaths by for each registration district (city, village, and town), with separate*

DISTRICT (Population April 15, 1910– State Census June 1, 1915)			Total births (stillbirths excluded)	Stillbirths	Total deaths (stillbirths excluded)	Total cases of reportable diseases	Age at death			Typhoid fever, 1	
							Under 1	1 to 4	60 years and over	Cases	Deaths
61 YATES COUNTY	**18,642**	**18,841**	**276**	**18**	**281**	**180**	**29**	**1**	**183**	**24**	...
50 Barrington	1,044	1,017	16	1	12	3	1	....	6	....	...
51 Benton	1,821	1,856	33	2	17	18	1	....	13	2	...
20 Penn Yan, village (55)	*4,597*	*4,725*	*51*	*4*	*84*	*93*	*8*	....	*52*	*8*	...
52 Italy	861	823	12	1	6	2	....	....	5	....	...
53 Jerusalem	2,444	2,424	32	1	29	20	5	1	16	2	...
54 Middlesex	1,122	1,133	14	2	9	7	1	....	4	4	...
55 Milo (20)	1,702	1,723	33	3	23	11	3	....	14	2	...
56 Potter	1,156	1,083	22	1	13	2	1	....	9	1	...
*(21) *Rushville, village (3,456)*	*(pt. 339*	*331)*	*2*	...	*7*	*2*	....	....	*7*	....	...
57 Starkey	1,310	1,420	27	1	31	7	3	....	21	1	...
22 Dundee, village	*1,228*	*1,236*	*17*	*1*	*28*	*9*	*2*	....	*22*	*1*	...
58 Torrey	673	744	14	...	9	2	2	....	5	1	...
23 Dresden, village	*345*	*326*	*3*	*1*	*13*	*4*	*2*	....	*9*	*2*	...

* See Rushville, Ontario county

District numbers, population (U. S. Census, April 25, 1910, and State selected age groups and from important communicable diseases (chiefly), statement for each State Institution: **1917** — (Concluded)

Measles,6		Scarlet fever, 7		Whooping cough, 8		Diphtheria, 9		Tuberculosis of lungs, 28, 29		Other forms of tuberculosis, 30–35		Cancer, 39–45	Diarrhea, enteritis under 2 years, 104	All other causes,		District No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths			Cases (reportable diseases)	Deaths	
19	....	**3**	....	**94**	**1**	**12**	**2**	**11**	**8**	**2**	**2**	**19**	**4**	**15**	**245**	**61**
2	....	....	....	....	....	1	....	.....	.....	.....	....	1	.....	.....	11	50
....	....	2	....	11	....	2	....	1	2	.....	....	3	.....	.....	12	51
2	....	*1*	....	*69*	*1*	*3*	....	*3*	*2*	*1*	*1*	*4*	*4*	*6*	*72*	*20*
1	....	....	....	....	....	....	....	1	1	.....	....	1	.....	.....	4	52
....	....	....	....	12	....	2	1	3	1	.....	....	1	.....	1	26	53
3	....	....	....	....	....	....	....	.....	1	.....	....	2	.....	.....	6	54
3	....	....	....	....	....	....	....	1	1	1	....	1	.....	4	21	55
....	....	....	....	....	....	1	1	.....	.....	.....	1	....	.....	.....	11	56
....	....	....	....	*1*	....	....	....	.....	.....	.....	....	....	.....	*1*	*7*	*21*
5	....	....	....	....	....	1	....	.....	.....	.....	....	2	.....	.....	29	57
3	....	....	....	*1*	....	*2*	....	*1*	.....	.....	....	*2*	.....	*1*	*26*	*22*
....	....	....	....	....	....	....	....	1	.....	.....	....	1	.....	.....	8	58
....	....	....	....	....	....	....	....	.....	.....	.....	....	*1*	.....	*2*	*12*	*23*

for complete total.

Table 18 — *Deaths in State institutions (exclusive of those in New*

causes

Line number	INSTITUTION	Total deaths	AGE AT		
			Under 1 year	1 to 4	Total under 5 years
	All deaths in State institutions	**3,434**	**9**	**7**	**16**
1	Auburn State Prison	9			
2	Binghamton State Hospital	214			
3	Buffalo State Hospital	202	1		1
4	Central Islip State Hospital	541		1	1
5	Clinton Prison, Dannemora	20			
6	Craig Colony, Sonyea	154			
7	Dannemora State Hospital	17			
8	Eastern New York Reformatory, Napanoch	1			
9	Elmira State Reformatory	1			
10	Gowanda State Hospital	114			
11	Great Meadow Prison, Comstock	2			
12	Hudson River State Hospital	315			
13	Kings Park State Hospital	449	2		2
14	Letchworth Village, Thiells	14			
15	Matteawan State Hospital	45	1		1
16	Middletown State Hospital	158			
17	Newark State Custodial Asylum	12			
18	Raybrook Hospital for Incipient Tuberculosis	10			
19	Rochester State Hospital	221			
20	Rome State Custodial Asylum	85	1	5	6
21	St. Lawrence State Hospital, Ogdensburg	190			
22	Sing Sing Prison	12			
23	State Institution for Feeble-Minded Children, Syracuse	10			
24	State Reformatory for Women, Bedford	3	3		3
25	State School for the Blind, Batavia				
26	State Soldiers and Sailors' Home, Bath	163			
27	State Training School for Girls, Hudson	1			
28	Utica State Hospital	145	1		1
29	West Haverstraw Hospital for Deformed and Crippled Children	1		1	1
30	Willard State Hospital	292			
31	Woman's Relief Corps Home, Oxford	33			
	Summary by location:				
32	Urban (cities)	1,293	4	5	9
33	Rural	2,141	5	2	7

York city), during 1917, *classified by broad age periods and important*

DEATH											
5 to 9	10 to 14	15 to 19	Total, 5 to 19	20 to 29	30 to 39	40 to 49	Total, 20 to 49	50 to 59	60 and over	Unknown	Line number
10	**25**	**52**	**87**	**256**	**488**	**562**	**1,306**	**590**	**1,434**	**1**	
.....	.....	.....	.....	2	2	2	6	1	2	.....	1
.....	.....	4	4	3	18	41	62	40	108	.....	2
.....	.....	.....	.....	9	27	27	63	45	93	.....	3
.....	.....	7	7	50	116	102	268	97	167	1	4
.....	.....	.....	.....	6	8	3	17	1	2	.....	5
.....	4	17	21	37	43	24	104	15	14	.....	6
.....	.....	.....	.....	5	7	3	15	1	1	.....	7
.....	.....	.....	.....	1	.....	.....	1	.....	.....	.....	8
.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	9
.....	.....	.....	.....	4	16	28	48	26	40	.....	10
.....	.....	.....	.....	1	.....	.....	1	1	.....	.....	11
.....	.....	1	1	17	43	63	123	63	128	.....	12
.....	1	3	4	47	82	103	232	79	132	.....	13
1	4	1	6	4	3	.....	7	1	.....	.....	14
.....	.....	.....	.....	1	10	6	17	12	15	.....	15
.....	.....	.....	.....	4	19	23	46	38	74	.....	16
.....	.....	1	1	6	3	1	10	1	.....	.....	17
.....	.....	1	1	4	4	1	9	.....	.....	.....	18
.....	.....	1	1	5	21	35	61	45	114	.....	19
9	14	12	35	22	7	7	36	4	4	.....	20
.....	.....	.....	.....	6	19	28	53	37	100	.....	21
.....	.....	.....	.....	4	3	3	10	1	1	.....	22
.....	2	2	4	4	.....	1	5	.....	1	.....	23
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25
.....	.....	.....	.....	.....	1	1	2	2	159	.....	26
.....	.....	.....	.....	.....	1	.....	1	.....	.....	.....	27
.....	.....	.....	.....	10	16	17	43	25	76	.....	28
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29
.....	.....	1	1	4	19	43	66	55	170	.....	30
.....	.....	.....	.....	.....	.....	.....	.....	.....	33	.....	31
9	16	20	45	70	143	190	403	248	588	.....	32
1	9	32	42	186	345	372	903	342	846	1	33

Table 18 — *Deaths in State institutions (exclusive of those in New*

causes

Line number	INSTITUTION	Total deaths all causes (still births excluded)	CAUSE		
			Typhoid fever, 1	Measles, 6	Diphtheria, 9
	All Deaths in State Institutions	**3,434**	**13**	**9**	**4**
1	Auburn State Prison	9			
2	Binghamton State Hospital	214		1	
3	Buffalo State Hospital	202			1
4	Central Islip State Hospital	541	2		
5	Clinton Prison, Dannemora	20			
6	Craig Colony, Sonyea	154		1	
7	Dannemora State Hospital	17			
8	Eastern New York Reformatory, Napanoch	1			
9	Elmira State Reformatory	1			
10	Gowanda State Hospital	114	7	1	
11	Great Meadow Prison, Comstock	2			
12	Hudson River State Hospital	315			3
13	Kings Park State Hospital	449			
14	Letchworth Village, Thiells	14			
15	Matteawan State Hospital	45			
16	Middletown State Hospital	158			
17	Newark State Custodial Asylum	12			
18	Raybrook Hospital for Incipient Tuberculosis	10	1		
19	Rochester State Hospital	221			
20	Rome State Custodial Asylum	85	1	6	
21	St. Lawrence State Hospital	190	2		
22	Sing Sing Prison	12			
23	State Institution for Feeble-Minded Children, Syracuse	10			
4	State Reformatory for Women, Bedford	3			
25	State School for the Blind, Batavia				
26	State Soldiers and Sailors' Home, Bath	163			
27	State Training School for Girls, Hudson	1			
28	Utica State Hospital	145			
29	West Haverstraw Hospital for Deformed and Crippled Children	1			
30	Willard State Hospital	292			
31	Woman's Relief Corps Home, Oxford	33			
	Summary by location:				
32	Urban (cities)	1,293	3	7	1
33	Rural	2,141	10	2	3

York city), during 1917, *classified by broad age periods and important* (Continued)

OF DEATH

Influenza, 10	Tuberculosis (all forms), 28–35	Pulmonary tuberculosis, 28–29	Tuberculous meningitis, 30	Other forms of tuberculosis, 31–35	Cancer, 39–45	Diabetes, 50	Apoplexy and cerebral hemorrhage, 64	Organic heart disease, 79	Arteriosclerosis, 81	Bronchitis, 89, 90	Pneumonia (all forms), 91, 92	Bronchopneumonia, 91	Line number
1	**542**	**516**	**4**	**22**	**67**	**11**	**112**	**511**	**213**	**8**	**503**	**288**	
...	1	1	.....	.....	.....	.....	.....	1	.....	1	3	.....	1
...	28	28	.....	.....	2	.....	3	32	14	.....	43	21	2
...	15	15	.....	.....	6	2	9	28	15	1	38	23	3
...	62	62	.....	.....	8	.....	8	48	52	.....	54	25	4
...	16	16	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	5
...	41	38	.....	3	1	.....	2	12	.....	1	24	10	6
...	10	10	.....	.....	.....	.....	.....	2	.....	.....	1	1	7
...	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8
...	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	9
...	8	7	.....	1	1	.....	3	20	2	.....	9	4	10
...	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	11
...	64	61	.....	3	3	.....	7	24	35	2	76	60	12
...	74	74	.....	.....	3	2	7	32	36	.....	81	45	13
...	2	1	1	.....	.....	1	.....	2	.....	.....	3	.....	14
...	4	4	.....	.....	3	.....	3	7	.....	.....	4	2	15
...	29	26	1	2	4	2	8	19	4	.....	16	3	16
1	4	4	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	17
...	8	8	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	18
...	21	16	1	4	4	.....	14	45	15	1	52	34	19
...	37	37	.....	.....	1	.....	3	2	.....	1	12	7	20
...	21	19	.....	2	3	1	3	73	1	.....	18	9	21
...	2	1	.....	1	.....	.....	.....	2	.....	.....	.....	.....	22
...	5	5	.....	.....	.....	.....	1	2	.....	.....	.....	.....	23
...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24
...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25
...	4	4	.....	.....	12	2	12	54	12	.....	10	8	26
...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27
...	16	16	.....	.....	4	.....	13	31	4	.....	12	4	28
...	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	29
...	68	62	1	5	10	.....	11	60	14	.....	46	31	30
...	.....	.....	.....	.....	2	1	3	10	9	1	1	1	31
...	179	168	2	9	27	5	57	243	53	4	198	103	32
1	363	348	2	13	40	6	55	268	160	4	305	185	33

Table 18 — *Deaths in State institutions (exclusive of those in New*
causes

Line number	INSTITUTION	CAUSE OF				
		Lobar pneumonia and unqualified, 92	Diarrhea and enteritis (under 2 years), 104	Appendicitis, 108	Hernia, intestinal obstruction, 109	Cirrhosis of liver, 113
	All Deaths in State Institutions	**215**	**1**	**2**	**20**	**7**
1	Auburn State Prison	3			1	
2	Binghamton State Hospital	22			2	
3	Buffalo State Hospital	15			3	
4	Central Islip State Hospital	29			3	2
5	Clinton Prison, Dannemora					
6	Craig Colony, Sonyea	14		1		1
7	Dannemora State Hospital					1
8	Eastern New York Reformatory, Napanoch					
9	Elmira State Reformatory					
10	Gowanda State Hospital	5				
11	Great Meadow Prison, Comstock					
12	Hudson River State Hospital	16			3	
13	Kings Park State Hospital	36		1	1	1
14	Letchworth Village, Thiells	3				
15	Matteawan State Hospital	2				
16	Middletown State Hospital	13			1	1
17	Newark State Custodial Asylum					
18	Raybrook Hospital for Incipient Tuberculosis					
19	Rochester State Hospital	18			1	1
20	Rome State Custodial Asylum	5				
21	St. Lawrence State Hospital	9			1	
22	Sing Sing Prison					
23	State Institution for Feeble-Minded Children, Syracuse					
24	State Reformatory for Women, Bedford					
25	State School for the Blind, Batavia					
26	State Soldiers and Sailors' Home, Bath	2			2	
27	State Training School for Girls, Hudson					
28	Utica State Hospital	8	1		1	
29	West Haverstraw Hospital for Deformed and Crippled Children					
30	Willard State Hospital	15				
31	Woman's Relief Corps Home, Oxford				1	
	Summary by location:					
32	Urban (Cities)	95	1		10	2
33	Rural	120		2	10	5

York city), *during* 1917, *classified by broad age periods and important* — (Concluded)

DEATH — *Concluded*

Nephritis and Bright's disease, 119, 120	Other puerperal affections, 134–136, 138–141	Total prenatal causes, 150–153	Congenital malformations, 150	Premature birth, 151a	Congenital debility, 151b	Old age, 154	Total accidents, 164–181, 185–186	Railroad accidents, 175a	Other accidents	Suicides, 155–163	Homicides, 182–184	All other causes	Line number
283	**1**	**7**	**3**	**1**	**3**	**2**	**46**	**3**	**43**	**19**	**1**	**1,051**	
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	1
23	.....	.....	.....	.....	.....	.....	5	1	4	1	.....	60	2
15	.....	.....	.....	.....	.....	.....	2	.....	2	.....	.....	67	3
52	.....	1	1	.....	.....	.....	4	.....	4	3	.....	242	4
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	5
5	.....	.....	.....	.....	.....	.....	4	1	3	2	.....	59	6
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	7
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9
3	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	58	10
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11
3	.....	.....	.....	.....	.....	.....	2	.....	2	.....	.....	93	12
28	.....	.....	.....	.....	.....	1	8	.....	8	3	.....	171	13
1	.....	.....	.....	.....	.....	.....	1	.....	1	.....	.....	4	14
7	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	16	15
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	49	16
1	.....	.....	.....	.....	.....	.....	2	.....	2	.....	.....	1	17
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18
7	.....	.....	.....	.....	.....	.....	2	.....	2	.....	.....	58	19
1	.....	2	2	.....	.....	.....	1	.....	1	1	.....	17	20
13	.....	.....	.....	.....	.....	.....	2	.....	2	2	.....	50	21
2	.....	.....	.....	.....	.....	.....	4	.....	4	.....	.....	2	22
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	23
.....	.....	3	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	24
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25
39	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16	26
.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	.....	.....	27
18	.....	.....	.....	.....	.....	.....	2	.....	2	3	.....	40	28
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29
38	.....	.....	.....	.....	.....	1	6	1	5	.....	.....	38	30
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	31
110	.....	3	2	1	.....	.....	19	1	18	10	.....	361	32
173	1	4	1	.....	3	2	27	2	25	9	1	690	33

Table 19 — *Movement of mortality from certain important causes of death in New York State, showing the annual number of deaths and death rates per* 100,000 *population:* **1885–1917**

YEAR	Population	Pulmonary Tuberculosis (28–29*)		Typhoid Fever (1)		Measles (6)	
		Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population
1885	5,550,690	11,238	202.5	1,067	19.2	1,170	21.1
1886	5,642,720	11,947	211.7	1,169	20.7	895	15.9
1887	5,734,751	11,609	202.4	1,327	23.1	1,205	21.1
1888	5,826,782	12,383	212.5	1,483	25.5	944	16.2
1889	5,918,813	12,390	209.3	1,550	26.2	899	15.2
1890	6,013,722	13,731	228.3	1,612	26.8	1,161	19.3
1891	6,140,294	13,445	219.0	1,926	31.4	1,200	19.5
1892	6,266,866	13,471	215.0	1,664	26.6	1,350	21.5
1893	6,393,438	13,123	205.3	1,685	26.4	789	12.3
1894	6,520,010	12,824	196.7	1,640	25.2	900	13.8
1895	6,646,582	13,267	199.6	1,716	25.8	1,266	19.0
1896	6,773,154	13,265	195.8	1,542	22.8	1,495	22.1
1897	6,899,726	12,641	183.2	1,351	19.6	873	12.7
1898	7,026,298	12,979	184.7	1,810	25.8	838	11.9
1899	7,152,870	13,412	187.5	1,604	22.4	756	10.6
1900	7,284,461	13,590	186.6	1,948	26.7	1,333	18.3
1901	7,471,268	13,766	184.3	1,741	23.3	859	11.5
1902	7,658,075	12,582	164.3	1,718	22.4	929	12.1
1903	7,844,882	13,194	168.2	1,665	21.2	721	9.2
1904	8,031,689	14,159	176.3	1,652	20.6	1,170	14.6
1905	8,218,496	14,061	171.1	1,554	18.9	988	12.0
1906	8,405,303	14,027	166.9	1,568	18.7	1,369	16.3
1907	8,592,110	14,431	168.0	1,673	19.5	997	11.6
1908	8,778,917	14,347	163.4	1,375	15.7	1,175	13.4
1909	8,965,724	13,996	156.1	1,315	14.7	1,272	14.2
1910	9,152,532	14,287	156.1	1,374	15.0	1,285	14.0
1911	9,343,768	14,491	155.1	1,316	14.1	977	10.5
1912	9,535,004	14,007	146.9	1,128	11.8	1,050	11.0
1913	9,726,241	14,096	144.9	1,018	10.5	1,072	11.0
1914	9,917,477	14,586	147.1	878	8.9	839	8.5
1915	10,108,713	14,512	143.6	775	7.7	844	8.3
1916	10,299,702	14,069	136.6	603	5.9	928	9.0
1917	10,490,680	14,795	141.0	593	5.7	904	8.6

* In 1910 a new title (29) was made in the *International List of Causes of Death* for Acute Miliary Tuberculosis which previously had been included under Title 27 (now 28) — Tuberculosis of Lungs. From 1910 through 1913, this title was excluded from the State totals for Pulmonary Tuberculosis rendering the data for these years not entirely comparable with previous years. A revision of these totals to include Title 29 has been made for 1910–1913 and slight increases in rates will be noted as compared with rates previously published.

Table 19 — *Movement of mortality from certain important causes of death in New York State, showing the annual number of deaths and death rates per* 100,000 *population:* **1885–1917** — (Concluded)

YEAR	SCARLET FEVER (7)		WHOOPING COUGH (8)		DIPHTHERIA (9)		DIARRHEA AND ENTERITIS (104) (Under 2 years)	
	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population
1885.....	1,184	21.3	834	15.0	4,508	81.2	.....	.....
1886.....	1,011	17.9	1,244	22.0	5,597	99.2	.....	.....
1887.....	1,267	22.1	447	7.8	6,490	113.2	.....	.....
1888.....	2,452	42.1	994	17.1	6,448	110.7	.....	.....
1889.....	2,205	37.3	1,303	22.0	5,855	98.9	.....	.....
1890.....	913	15.2	1,156	19.2	4,915	81.7	.....	.....
1891.....	2,252	36.7	825	13.4	5,072	82.6	.....	.....
1892.....	2,177	34.7	921	14.7	5,918	94.4	.....	.....
1893.....	1,626	25.4	1,203	18.8	5,947	93.0	.....	.....
1894.....	1,227	18.8	1,020	15.6	6,592	101.1	.....	.....
1895.....	850	12.8	1,169	17.6	4,989	75.1	.....	.....
1896.....	759	11.2	996	14.7	4,597	67.9	.....	.....
1897.....	841	12.2	825	12.0	4,115	59.6	.....	.....
1898.....	837	11.9	1,155	16.4	2,612	37.2	.....	.....
1899.....	730	10.2	886	12.4	2,786	38.9	.....	.....
1900.....	689	9.5	1,020	14.0	3,306	45.4	*8,969	123.1
1901.....	1,430	19.1	721	9.7	3,026	40.5	8,053	107.8
1902.....	1,215	15.9	923	12.1	2,859	37.3	7,016	91.6
1903.....	1,057	13.5	811	10.3	3,035	38.7	6,558	83.6
1904.....	1,194	14.9	426	5.3	3,041	37.9	8,417	104.8
1905.....	726	8.8	847	10.3	2,296	27.9	8,914	108.5
1906.....	690	8.2	821	9.8	2,691	32.0	9,249	110.0
1907.....	1,032	12.0	789	9.2	2,603	30.3	9,213	107.2
1908.....	1,688	19.2	503	5.7	2,473	28.2	9,111	103.8
1909.....	1,205	13.4	783	8.7	2,313	25.8	7,873	87.8
1910.....	1,617	17.7	727	7.9	2,433	26.6	9,036	98.7
1911.....	1,149	12.3	819	8.8	1,963	21.0	7,301	78.1
1912.....	789	8.3	683	7.2	1,624	17.0	7,035	73.8
1913.....	837	8.6	822	8.5	1,853	19.1	6,964	71.6
1914.....	687	6.9	730	7.4	2,015	20.3	6,287	63.4
1915.....	415	4.1	759	7.5	1,770	17.5	6,510	64.4
1916.....	178	1.7	745	7.2	1,524	14.8	5,387	52.3
1917.....	259	2.5	894	8.5	1,755	16.7	5,624	53.6

* In the absence of comparable State figures previous to 1907, U. S. Census figures are used.

Table 20 — *Movement of mortality from certain important causes of death in New York State, showing the annual number of deaths and death rates per* 100,000 *population:* **1900–1917** *

YEAR	Population	Apoplexy (Cerebral Hemorrhage) (64)		Organic Heart Disease and Endocarditis (78, 79)		Diseases of the Arteries, Arteriosclerosis, etc. (81)	
		Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population
1900	7,284,461	5,831	80.0	9,657	132.6	369	5.1
1901	7,471,268	6,008	80.4	10,282	137.6	444	5.9
1902	7,658,075	6,083	79.4	10,894	142.3	604	7.9
1903	7,844,882	6,082	77.5	11,447	145.9	738	9.4
1904	8,031,689	6,633	82.6	13,274	165.3	897	11.2
1905	8,218,496	6,736	82.0	12,996	158.2	1,042	12.7
1906	8,405,303	6,645	79.1	13,584	161.6	1,165	13.9
1907	8,592,110	7,135	83.0	13,924	162.1	1,338	15.6
1908	8,778,917	6,198	70.6	13,624	155.2	2,118	24.1
1909	8,965,724	5,239	58.4	14,029	156.5	3,134	35.0
1910	9,152,532	5,556	60.7	14,380	157.1	3,363	36.7
1911	9,343,768	5,766	61.7	15,346	164.2	4,178	44.7
1912	9,535,004	5,863	61.5	15,807	165.8	4,392	46.1
1913	9,726,241	5,776	59.4	16,716	171.9	4,779	49.1
1914	9,917,477	6,716	67.7	20,682	208.5	3,956	39.9
1915	10,108,713	6,423	63.5	21,046	208.2	3,984	39.4
1916	10,299,702	6,471	62.8	21,837	212.0	4,466	43.4
1917	10,490,680	6,796	64.8	22,626	215.7	4,825	46.0

Table 20 — *Movement of mortality from certain important causes of death in New York State, showing the annual number of deaths and death rates per* 100,000 *population:* **1900–1917** * — (Continued)

YEAR	Population	Summary of Diseases of the Cardio-vascular System (64, 78, 79, 81)		Acute Nephritis, Bright's Disease (119, 120)		Pneumonia, All Forms (91, 92)	
		Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population
1900	7,284,461	15,857	217.7	8,628	118.4	16,596	227.8
1901	7,471,268	16,734	224.0	9,005	120.5	14,660	196.2
1902	7,658,075	17,581	229.6	9,035	118.0	14,085	183.9
1903	7,844,882	18,267	232.8	9,721	123.9	14,213	181.2
1904	8,031,689	20,804	259.0	10,674	132.9	17,402	216.7
1905	8,218,496	20,774	252.8	10,413	126.7	14,581	177.4
1906	8,405,303	21,394	254.5	10,926	130.0	15,519	184.6
1907	8,592,110	22,397	260.7	10,575	123.1	18,104	210.7
1908	8,778,917	21,940	249.9	9,883	112.6	14,852	169.2
1909	8,965,724	22,402	249.9	10,720	119.6	16,597	185.1
1910	9,152,532	23,299	254.6	11,217	122.6	17,115	187.0
1911	9,343,768	25,290	270.7	11,003	117.8	16,460	176.2
1912	9,535,004	26,062	273.3	11,897	124.8	16,537	173.4
1913	9,726,241	27,261	280.3	11,739	120.7	16,530	169.9
1914	9,917,477	31,354	316.1	11,308	114.0	15,510	156.4
1915	10,108,713	31,453	311.1	11,582	114.6	17,209	170.2
1916	10,299,702	32,774	318.2	12,801	124.3	17,314	168.1
1917	10,490,680	34,247	326.5	13,136	125.2	18,673	178.0

* In the absence of State data, previous to 1907, U. S. census figures are used for all causes listed.

Table 20 — *Movement of mortality from certain important causes of death in New York State, showing the annual number of deaths and death rates per* 100,000 *population:* **1900–1917** *—(Concluded)

YEAR	Population	CANCER (39–45)		SUICIDE (155–163)		VIOLENT DEATHS, SUICIDE EXCLUDED (164–186)	
		Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population
1900	7,284,461	4,871	66.9	858	11.8	5,707	78.3
1901	7,471,268	5,033	67.4	806	10.8	7,223	96.7
1902	7,658,075	4,990	65.2	894	11.7	6,138	80.2
1903	7,844,882	5,456	69.5	938	12.0	6,905	88.0
1904	8,031,689	5,697	70.9	1,031	12.8	8,110	101.0
1905	8,218,496	6,056	73.7	1,219	14.8	7,379	89.8
1906	8,405,303	6,168	73.4	1,188	14.1	7,948	94.6
1907	8,592,110	6,420	74.7	1,207	14.0	8,065	93.9
1908	8,778,917	6,554	74.7	1,511	17.2	7,300	83.2
1909	8,965,724	7,060	78.7	1,494	16.7	7,240	80.8
1910	9,152,532	7,522	82.2	1,479	16.2	7,840	85.7
1911	9,343,768	7,970	85.3	1,436	15.4	8,661	92.7
1912	9,535,004	8,250	86.5	1,340	14.1	8,121	85.2
1913	9,726,241	8,536	87.8	1,476	15.2	8,425	86.6
1914	9,917,477	8,906	89.8	1,516	15.3	8,134	82.0
1915	10,108,713	9,301	92.0	1,680	16.6	7,826	77.4
1916	10,299,702	9,419	91.4	1,492	14.5	8,599	83.5
1917	10,490,680	9,736	92.8	1,441	13.7	9,700	92.5

* In the absence of State data, previous to 1907, U. S. census figures are used for all causes listed except cancer.

Table 21 — *Comparative movement of mortality from the chief communicable diseases in New York city and rest of State, showing the annual number of deaths and death rates per* 100,000 *population:* **1898–1917**

YEAR	TYPHOID FEVER (1)				MEASLES (6)			
	NEW YORK CITY		REST OF STATE		NEW YORK CITY		REST OF STATE	
	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population
1898	688	21.1	1,122	29.8	641	19.7	197	5.2
1899	546	16.3	1,058	27.8	589	17.6	167	4.4
1900	718	20.8	1,230	32.1	816	23.7	517	13.5
1901	727	20.3	1,014	26.1	444	12.4	415	10.7
1902	762	20.5	956	24.3	710	19.1	219	5.6
1903	634	16.5	1,031	25.8	506	13.1	215	5.4
1904	659	16.5	993	24.6	880	22.1	290	7.2
1905	635	15.4	919	22.4	517	12.5	471	11.5
1906	639	15.0	929	22.4	1,147	26.9	222	5.4
1907	740	16.9	933	22.2	728	16.6	269	6.4
1908	538	11.9	837	19.7	972	21.5	203	4.8
1909	564	12.1	751	17.4	996	21.4	276	6.4
1910	558	11.6	816	18.7	774	16.1	511	11.7
1911	545	11.1	771	17.5	658	13.3	319	7.2
1912	499	9.9	629	14.1	673	13.3	377	8.4
1913	362	7.0	656	14.5	628	12.1	444	9.8
1914	334	6.3	544	11.9	559	10.5	280	6.1
1915	333	6.1	442	9.5	630	11.5	214	4.6
1916	215	3.8	388	8.3	489	8.7	439	9.3
1917	229	4.0	364	7.7	560	9.8	344	7.2

Table 21 — *Comparative movement of mortality from the chief communicable diseases in New York city and rest of State, showing the annual number of deaths and death rates per* 100,000 *population:* **1898–1917** — (Continued)

YEAR	SCARLET FEVER (7)				WHOOPING COUGH (8)			
	NEW YORK CITY		REST OF STATE		NEW YORK CITY		REST OF STATE	
	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population
1898	705	21.7	132	3.5	715	22.0	440	11.7
1899	533	15.9	197	5.2	514	15.3	372	9.8
1900	466	13.5	223	5.8	584	16.9	436	11.4
1901	1,162	32.4	268	6.9	292	8.1	429	11.0
1902	941	25.3	274	7.0	607	16.3	316	8.0
1903	737	19.1	320	8.0	334	8.7	477	11.9
1904	852	21.4	342	8.5	198	5.0	228	5.6
1905	469	11.4	257	6.3	409	9.9	438	10.7
1906	492	11.6	198	4.8	362	8.5	459	11.1
1907	797	18.2	235	5.6	394	9.0	395	9.4
1908	1,327	29.3	361	8.5	185	4.1	318	7.5
1909	787	16.9	418	9.7	401	8.6	382	8.9
1910	952	19.9	665	15.3	294	6.1	433	9.9
1911	741	15.0	408	9.2	383	7.8	436	9.9
1912	615	12.1	174	3.9	291	5.7	392	8.8
1913	507	9.8	330	7.3	420	8.1	402	8.9
1914	452	8.5	235	5.1	279	5.2	451	9.8
1915	291	5.3	124	2.7	396	7.2	363	7.8
1916	96	1.7	82	1.7	352	6.3	393	8.4
1917	120	2.1	139	2.9	489	8.5	405	8.5

Table 21 — *Comparative movement of mortality from the chief communicable diseases in New York city and rest of State, showing the annual number of deaths and death rates per* 100,000 *population:* **1898–1917** — (Concluded)

YEAR	DIPHTHERIA (9)				PULMONARY TUBERCULOSIS (28, 29)*			
	NEW YORK CITY		REST OF STATE		NEW YORK CITY		REST OF STATE	
	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population	Deaths	Rate per 100,000 population
1898	1,776	54.5	836	22.2	7,718	237.0	5,261	139.5
1899	1,925	57.5	861	22.6	8,046	240.1	5,366	141.1
1900	2,275	66.0	1,031	26.9	8,162	236.7	5,428	141.5
1901	2,067	57.7	959	24.7	8,141	227.2	5,625	144.7
1902	2,013	54.1	846	21.5	7,589	204.1	4,993	126.7
1903	2,185	56.7	850	21.3	7,990	207.4	5,204	130.3
1904	2,093	52.5	948	23.4	8,516	213.6	5,643	139.5
1905	1,538	37.3	758	18.5	8,528	206.9	5,533	135.1
1906	1,887	44.3	804	19.4	8,976	210.9	5,051	121.7
1907	1,741	39.6	862	20.5	8,996	204.9	5,435	129.4
1908	1,763	39.0	710	16.7	8,867	195.9	5,480	128.8
1909	1,715	36.8	598	13.9	8,645	185.5	5,351	124.3
1910	1,715	35.8	718	16.5	8,881	185.2	5,406	124.1
1911	1,284	26.0	679	15.4	8,967	181.9	5,524	125.1
1912	1,126	22.2	498	11.1	8,781	173.4	5,226	116.9
1913	1,334	25.7	519	11.5	8,842	170.1	5,254	116.1
1914	1,492	28.0	523	11.4	9,138	171.3	5,448	118.8
1915	1,278	23.4	492	10.6	9,108	166.6	5,404	116.5
1916	1,031	18.4	493	10.5	8,663	154.6	5,406	115.1
1917	1,158	20.2	597	12.6	9,120	159.0	5,675	119.4

* See footnote, page 540. The revised totals for New York City for 1910–13 were taken from U. S. Census Reports.

Table 22 — *Movement of mortality from cancer and other malignant tumors in New York State, showing the number of deaths and annual death rates per* 100,000 *population, according to the organ or part of the body affected:* **1907–1917**

(Heading numbers indicate titles of detailed International List.)

YEAR	CANCER OF BUCCAL CAVITY (39)		CANCER OF THE STOMACH AND LIVER (40)		CANCER OF THE PERITONEUM, INTESTINES, RECTUM (41)		CANCER OF THE FEMALE GENITAL ORGANS (42)	
	Total deaths	Rate per 100,000 population	Total deaths	Rate per 100,000 population	Total deaths	Rate per 100,000 population	Total deaths	Rate per 100,000 population
1907	206	2.4	2,396	27.9	812	9.5	946	11.0
1908	170	1.9	2,567	29.2	852	9.7	1,046	11.9
1909	267	3.0	2,677	29.9	926	10.3	1,146	12.8
1910	285	3.1	2,933	32.0	1,121	12.2	1,096	12.0
1911	310	3.3	2,987	32.0	1,109	11.9	1,202	12.9
1912	290	3.0	3,071	32.2	1,213	12.7	1,209	12.7
1913	291	3.0	3,228	33.2	1,263	13.0	1,260	13.0
1914	320	3.2	3,333	33.6	1,310	13.2	1,223	12.3
1915	324	3.2	3,482	34.4	1,409	13.9	1,326	13.1
1916	321	3.1	3,518	34.2	1,411	13.7	1,281	12.4
1917	327	3.1	3,629	34.6	1,480	14.1	1,297	12.4

Table 22 — *Movement of mortality from cancer and other malignant tumors in New York State, showing the number of deaths and annual death rates per* 100,000 *population, according to the organ or part of the body affected:* **1907–1917** — (Concluded)

(Heading numbers indicate titles of detailed International List.)

YEAR	CANCER OF THE BREAST (43)		CANCER OF THE SKIN (44)		CANCER OF OTHER OR UNSPECIFIED ORGANS (45)		TOTAL ALL FORMS	
	Total deaths	Rate per 100,000 population	Total deaths	Rate per 100,000 population	Total deaths	Rate per 100,000 population	Number	Rate per 100,000 population
1907	617	7.2	201	2.3	1,242	14.5	6,420	74.7
1908	602	6.9	200	2.3	1,117	12.7	6,554	74.7
1909	665	7.4	202	2.2	1,177	13.1	7,060	78.7
1910	732	8.0	192	2.1	1,163	12.7	7,522	82.2
1911	787	8.4	215	2.3	1,360	14.6	7,970	85.3
1912	750	7.9	257	2.7	1,460	15.3	8,250	86.5
1913	810	8.3	213	2.2	1,471	15.1	8,536	87.8
1914	916	9.2	215	2.2	1,589	16.0	8,906	89.8
1915	877	8.7	222	2.2	1,661	16.4	9,301	92.0
1916	971	9.4	248	2.4	1,669	16.2	9,419	91.4
1917	975	9.3	240	2.3	1,788	17.0	9,736	92.8

Table 23 — *Number of deaths from each cause during* 1917, *in the entire State, New York city and rest of State, according to the detailed International List of causes of death*

Detailed int. list no.	CAUSE OF DEATH (Detailed International List)	State of New York	New York City	Rest of State
	All causes	**154,127**	**75,575**	**75,552**
	I.— General diseases	**39,777**	**21,877**	**17,900**
1	Typhoid fever	593	229	364
2	Typhus fever	2	2	.....
3	Relapsing fever	.....	.....	.....
4	Malaria	25	10	15
5	Smallpox	4	.....	4
6	Measles	904	560	344
7	Scarlet fever	259	120	139
8	Whooping cough	894	489	405
9	Diphtheria and croup	1,755	1,158	597
10	Influenza	1,694	657	1,037
11	Miliary fever	.....	.....	.....
12	Asiatic cholera	.....	.....	.....
13	Cholera nostras	9	.....	9
14	Dysentery	164	42	122
15	Plague	.....	.....	.....
16	Yellow fever	.....	.....	.....
17	Leprosy	3	3	.....
18	Erysipelas	467	252	215
19	Other epidemic diseases	44	24	20
20	Purulent infection and septicemia	189	65	124
21	Glanders	2	2	.....
22	Anthrax	12	9	3
23	Rabies	5	3	2
24	Tetanus	77	22	55
25	Mycoses	6	4	2
26	Pellagra	27	13	14
27	Beriberi	1	1	.....
	Tuberculosis (total)	**16,632**	**10,142**	**6,490**
28	Tuberculosis of the lungs	14,373	8,825	5,548
29	Acute miliary tuberculosis	422	295	127
30	Tuberculous meningitis	1,077	680	397
31	Abdominal tuberculosis	346	134	212
32	Pott's disease	115	48	67
33	White swellings	72	41	31
34	Tuberculosis of other organs	164	95	69
35	Disseminated tuberculosis	63	24	39
36	Rickets	70	46	24
37	Syphilis	972	528	444
38	Gonococcus infection	49	34	15
	Cancer and other malignant tumors (total)	**9,736**	**4,867**	**4,869**
39	Of the buccal cavity	327	164	163
40	Of the stomach, liver	3,629	1,906	1,723
41	Of the peritoneum, intestines, rectum	1,480	723	757
42	Of the female genital organs	1,297	579	718
43	Of the breast	975	482	493
44	Of the skin	240	90	150
45	Of other organs or of organs not specified	1,788	923	865
46	Other tumors (tumors of the female genital organs excepted)	54	21	33
47	Acute articular rheumatism	528	255	273
48	Chronic rheumatism and gout	155	56	99
49	Scurvy	19	15	4
50	Diabetes	2,281	1,153	1,128
51	Exophthalmic goiter	180	62	118
52	Addison's disease	56	17	39
53	Leukemia	221	140	81
54	Anemia, chlorosis	598	197	401
55	Other general diseases	184	76	108
56	Alcoholism (acute or chronic)	835	560	275
57	Chronic lead poisoning	22	15	7
58	Other chronic occupation poisonings	3	1	2
59	Other chronic poisonings	46	27	19

Table 23 — *Number of deaths from each cause during* 1917, *in the entire State, New York city and rest of State, according to the detailed International List of causes of death* — (Continued)

Detailed int. list no.	CAUSE OF DEATH (Detailed International List)	State of New York	New York City	Rest of State
	II.— Diseases of the Nervous System and of the Organs of Special Sense	**11,478**	**2,697**	**8,781**
60	Encephalitis	75	24	51
61	Meningitis (total)	674	371	303
	Simple meningitis	360	186	174
	Cerebrospinal meningitis (undefined)	267	185	82
	Cerebrospinal fever	47	.....	47
62	Locomotor ataxia	233	85	148
63	Other diseases of the spinal cord (total)	593	220	373
	Acute anterior poliomyelitis	92	53	39
	Other diseases of the spinal cord [1]	501	167	334
64	Cerebral hemorrhage, apoplexy	6,796	794	6,002
65	Softening of the brain	121	7	114
66	Paralysis without specified cause	414	44	370
67	General paralysis of the insane	932	310	622
68	Other forms of mental alienation	220	93	127
69	Epilepsy	399	157	242
70	Convulsions (nonpuerperal)	8	4	4
71	Convulsions of infants	177	56	121
72	Chorea	17	10	7
73	Neuralgia and neuritis	56	20	36
74	Other diseases of the nervous system	413	243	170
75	Diseases of the eyes and their annexa	8	5	3
76	Diseases of the ears	342	254	88
	III.— Diseases of the Circulatory System	**28,978**	**14,818**	**14,160**
77	Pericarditis	112	40	72
78	Acute endocarditis	938	313	625
79	Organic diseases of the heart	21,688	11,102	10,586
80	Angina pectoris	865	293	572
81	Diseases of the arteries, atheroma, aneurism, etc.	4,825	2,903	1,922
82	Embolism and thrombosis	370	70	300
83	Diseases of the veins (varice , hemorrhoids, phlebitis, etc.)	79	45	34
84	Diseases of the lymphatic system (lymphangitis, etc.)	83	49	34
85	Hemorrhage; other diseases of the circulatory system	18	3	15
	IV.— Diseases of the Respiratory System	**21,617**	**12,471**	**9,146**
86	Diseases of the nasal fossae	14	7	7
87	Diseases of the larynx	68	16	52
88	Diseases of the thyroid body	61	26	35
89	Acute bronchitis	1,323	789	534
90	Chronic bronchitis	527	135	392
91	Bronchopneumonia	6,604	3,783	2,821
92	Pneumonia (total)	12,069	7,268	4,801
	Lobar pneumonia	11,182	7,268	3,914
	Pneumonia (undefined)	887	.....	887
93	Pleurisy	439	202	237
94	Pulmonary congestion, pulmonary apoplexy	172	54	118
95	Gangrene of the lung	19	5	14
96	Asthma	177	120	57
97	Pulmonary emphysema	34	17	17
98	Other disease of the respiratory system (tuberculosis excepted)	110	49	61
	V.— Diseases of the Digestive System	**13,433**	**6,816**	**6,617**
99	Diseases of the mouth and annexa	100	59	41
100	Diseases of the pharynx	264	138	126
101	Diseases of the esophagus	24	10	14
102	Ulcer of the stomach	621	355	266
103	Other diseases of the stomach (cancer excepted)	670	136	534

[1] Exclusive of acute anterior poliomyelitis (infantile paralysis)

Table 23 — *Number of deaths from each cause during* 1917, *in the entire State, New York city and rest of State, according to the detailed International List of causes of death* — (Continued)

Detailed int. list no.	CAUSE OF DEATH (Detailed International List)	State of New York	New York City	Rest of State
	V.—DISEASES OF THE DIGESTIVE SYSTEM—(*Cont'd*)			
104	Diarrhea and enteritis (under 2 years)	5,624	3,181	2,443
105	Diarrhea and enteritis (2 years and over)	1,131	444	687
106	Ankylostomiasis	.....	.....	.....
107	Intestinal parasites	10	6	4
108	Appendicitis and typhlitis	1,191	668	523
109	Hernia, intestinal obstruction (total)	1,285	601	684
	Hernia	530	286	244
	Intestinal obstruction	755	315	440
110	Other diseases of the intestines	153	83	70
111	Acute yellow atrophy of the liver	27	5	22
112	Hydatid tumor of the liver	6	5	1
113	Cirrhosis of the liver	1,319	668	651
114	Biliary calculi	333	179	154
115	Other diseases of the liver	415	191	224
116	Diseases of the spleen	11	5	6
117	Simple peritonitis (nonpuerperal)	162	32	130
118	Other diseases of the digestive system (cancer and tuberculosis excepted)	87	50	37
	IV.— Nonvenereal Diseases of the Genitourinary System and Annexa	**14,725**	**7,515**	**7,210**
119	Acute nephritis	881	350	531
120	Bright's disease	12,255	6,377	5,878
121	Chyluria	.....	.....	.....
122	Other diseases of the kidneys and annexa	274	122	152
123	Calculi of the urinary passages	87	57	30
124	Diseases of the bladder	155	49	106
125	Diseases of the urethra, urinary abscess, etc	43	28	15
126	Diseases of the prostate	405	184	221
127	Nonvenereal diseases of the male genital organs	19	12	7
128	Uterine hemorrhage (nonpuerperal)	7	3	4
129	Uterine tumor (noncancerous)	243	158	85
130	Other diseases of the uterus	101	47	54
131	Cysts and other tumors of the ovary	113	64	49
132	Salpingitis and other diseases of the female genital organs	138	62	76
133	Nonpuerperal diseases of the breast (cancer excepted)	4	2	2
	VII.— The Puerperal State	**1,333**	**651**	**682**
134	Accidents of pregnancy	133	77	56
135	Puerperal hemorrhage	133	80	53
136	Other accidents of labor	143	74	69
137	Puerperal septicemia	469	213	256
138	Puerperal albuminuria and convulsions	379	169	210
139	Puerperal phlegmasia alba dolens, embolus, sudden death	65	30	35
140	Following childbirth (not otherwise defined)	5	2	3
141	Puerpearl diseases of the breast	6	6	.....
	VIII.— Diseases of the Skin and of the Cellular Tissue	**565**	**296**	**259**
142	Gangrene	176	43	133
143	Furuncle	98	73	25
144	Acute abscess	195	115	80
145	Other diseases of the skin and annexa	96	65	31
	IX.— Diseases of the Bones and of the Organs of Locomotion	**303**	**157**	**146**
146	Diseases of the bones (tuberculosis excepted)	258	136	122
147	Diseases of the joints (tuberculosis and rheumatism excepted)	40	21	19
148	Amputations	.....	.....	.....
149	Other diseases of the organs of locomotion	5	.....	5

Table 23 — *Number of deaths from each cause during* 1917, *in the entire State, New York city and rest of State, according to the detailed International List of causes of death* — (Continued)

Detailed int. list no.	CAUSE OF DEATH (Detailed International List)	State of New York	New York City	Rest of State
	X.— Malformations	**1,472**	**698**	**774**
150	Congenital malformations (stillbirths not included) (total)	1,472	698	774
	Hydrocephalus	125	58	67
	Congenital malformations of the heart	861	376	485
	Other congenital malformations	486	264	222
	XI.— Early Infancy	**8,273**	**4,519**	**3,759**
151	Congenital debility, icterus, and sclerema (total)	6,312	3,387	2,925
	Premature birth	4,736	2,433	2,303
	Congenital debility, "atrophy," "marasmus", etc.	1,576	954	622
152	Other causes peculiar to early infancy (total)	1,944	1,122	822
	Injuries at birth	1,035	478	557
	Other causes peculiar to early infancy[1]	909	644	265
153	Lack of care	17	5	12
	XII.— Old Age	**885**	**271**	**614**
154	Senility	885	271	614
	XIII.— External Causes	**11,141**	**5,742**	**5,399**
	Suicide (total)	1,441	778	663
155	By poison	188	57	131
156	By asphyxia	371	308	63
157	By hanging or strangulation	255	84	171
158	By drowning	85	20	65
159	By firearms	294	136	158
160	By cutting or piercing instruments	103	51	52
161	By jumping from high places	124	113	11
162	By crushing	12	7	5
163	Other suicides	9	2	7
	Accidental or undefined (total)	9,274	4,716	4,558
164	Poisoning by food	50	17	33
165	Other acute poisonings	140	60	80
166	Conflagration	117	58	59
167	Burns (conflagration excepted)	831	450	381
168	Absorption of deleterious gases (conflagration excepted)	800	603	197
169	Accidental drowning	994	504	490
170	Traumatism by firearms	95	20	75
171	Traumatism by cutting or piercing instruments	33	25	8
172	Traumatism by fall	2,000	1,036	964
173	Traumatism in mines and quarries (total)	13	3	10
	Traumatism in mines	8	.....	8
	Traumatism in quarries	5	3	2
174	Traumatism by machines	191	91	100
175	Traumatism by other crushing (total)	2,676	1,046	1,630
	Railroad accidents and injuries	831	98	733
	Street-car accidents and injuries	272	139	133
	Automobile accidents and injuries	1,066	518	548
	Injuries by other vehicles	294	147	147
	Landslide, other crushing	213	144	69
176	Injuries by animals	67	18	49
177	Starvation	9	5	4
178	Excessive cold	52	8	44
179	Effects of heat	665	530	135
180	Lightning	15	2	13
181	Electricity (lightning excepted)	64	18	46
185	Fractures (cause not specified)	151	93	58
186	Other external violence	311	129	182

[1] Exclusive of injuries at birth.

Table 23 — *Number of deaths from each cause during* 1917, *in the entire State, New York city and rest of State, according to the detailed International List of causes of death* — (Concluded)

Detailed int. list no.	CAUSE OF DEATH (Detailed International List)	State of New York	New York City	Rest of State
	XIII.—EXTERNAL CAUSES—(*Concluded*)			
	Homicide (total)	426	248	178
182	By firearms	223	125	98
183	By cutting or piercing instruments	65	40	25
184	By other means	138	83	55
	XIV.— Ill-Defined Diseases	**142**	**47**	**95**
187	Ill-defined organic diseases	5	.....	5
188	Sudden death	3	.....	3
189	Not specified or ill-defined (total)	134	47	87
	Ill-defined	.....	.....	.....
	Not specified or unknown	.....	.....	.....

Table 24 — *Deaths from each cause (detailed International List) in the year age periods),*

Internat. No.	CAUSE OF DEATH		Age									
			All ages	Under 1 year	1	2	3	4	Under 5 years	5–9	10–14	15–19
	All causes		75,552	9,908	1,648	777	478	353	13,166	1,153	761	1,248
	Males		40,435	5,680	847	425	266	189	7,407	624	403	671
	Females		35,117	4,228	801	352	212	166	5,759	529	353	577
	I.— General diseases		17,900	898	478	298	231	144	2,049	459	275	543
	Males		9,025	480	226	168	129	75	1,078	232	124	246
	Females		8,875	418	252	130	102	69	971	227	151	302
1	Typhoid fever	M	219	1	1	2	3	1	8	10	11	22
		F	145	1	3	2	1	2	9	13	13	18
2	Typhus fever	M										
		F										
3	Relapsing fever	M										
		F										
4	Malaria	M	8		1				1			1
		F	7								1	
5	Smallpox	M	2									
		F	2								1	
6	Measles	M	181	43	52	25	19	10	149	13	3	5
		F	163	37	52	20	15	2	126	10	5	2
7	Scarlet fever	M	71	2	3	11	9	6	31	21	6	4
		F	68	1	6	7	12	4	30	15	9	7
8	Whooping cough	M	192	119	44	13	7	2	185	6		
		F	213	123	55	15	11	3	207	5		
9	Diphtheria and croup	M	300	13	33	53	51	29	179	75	21	6
		F	297	21	44	34	34	26	159	90	15	4
10	Influenza	M	453	50	9	6	1	2	68	6	3	5
		F	581	32	10	4	4	1	51	4	3	2
11	Miliary fever	M										
		F										
12	Asiatic cholera	M										
		F										
13	Cholera nostras	M	4	2					2	1		
		F	5	1	1			1	3	1		
14	Dysentery	M	62	6	5	3	3	2	19	4		
		F	60	5	4	4		2	15	2		1
15	Plague	M										
		F										
16	Yellow fever	M										
		F										
17	Leprosy	M										
		F										
18	Erysipelas	M	124	31					31	1	1	3
		F	91	25	1				26			3
19	Other epidemic diseases	M	10	7	1	1			9	1		
		F	10	1	3	1	1		6	3		
20	Purulent infection and septicemia	M	80	5	1	3	1		10	2	3	2
		F	44	7	1	2			10		1	1
21	Glanders	M										
		F										
22	Anthrax	M	3									
		F										
23	Rabies	M	2								1	
		F										
24	Tetanus	M	40	7				1	8	2	4	4
		F	15	1		1		1	3	2	1	1
25	Mycoses	M	1									
		F	1									

State, outside New York city, during 1917, *classified by age at death (five for each sex*

Internat. No.	Age — (*Continued*)																
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–99	100 years and over	Unknown
	2,070	**2,408**	**2,536**	**2,849**	**3,198**	**3,630**	**4,161**	**4,893**	**5,434**	**6,356**	**6,726**	**6,195**	**4,796**	**2,651**	**965**	**206**	**30**	**70**
	1,150	1,372	1,417	1,680	1,886	2,148	2,378	2,747	3,022	3,345	3,382	3,008	2,158	1,093	393	74	17	56
	920	1,036	1,119	1,169	1,312	1,532	1,783	2,146	2,411	3,011	3,344	3,187	2,638	1,558	572	132	13	14
	968	**1,083**	**1,051**	**1,073**	**1,129**	**1,212**	**1,311**	**1,359**	**1,319**	**1,235**	**1,061**	**826**	**548**	**249**	**77**	**15**	**3**	**9**
	495	612	572	636	632	622	660	681	637	615	462	355	227	94	30	5	1	9
	473	471	479	437	497	590	651	669	682	670	599	471	321	155	47	10	2	....
1	36	30	19	16	13	13	14	3	5	5	7	3	2	1	....	....	....	1
	14	10	11	10	9	12	10	5	3	4	2	2	....	....	....	....	....	....
2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4	....	....	....	2	1	....	....	1	1	1	....	....	....	....	....	....	....	....
	....	1	....	....	1	....	1	1	1	....	1	....	....	....	....	....	....	....
5	....	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....
6	6	....	....	2	....	2	....	1	....	....	....	....	....	....	....	....	....	....
	2	....	1	3	1	4	2	1	3	1	2	....	....	....	....	....	....	....
7	1	2	1	1	1	1	1	1	....	....	....	....	....	....	....	....	....	....
	2	....	1	3	....	....	1	....	....	....	....	....	....	....	....	....	....	....
8	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....
9	1	3	2	4	1	3	3	....	....	2	....	....	....	....	....	....	....	....
	7	2	8	2	....	2	3	....	2	1	2	....	....	....	....	....	....	....
10	6	12	8	6	20	14	18	26	31	39	29	54	51	39	16	2	....	....
	7	4	7	8	17	13	16	17	33	52	67	78	98	74	25	8	....	....
11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
13	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....
14	....	....	1	1	3	....	1	2	3	4	7	5	7	2	1	....	1	1
	....	....	1	....	1	2	1	3	2	5	6	10	7	3	1	....	....	....
15	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
18	1	2	5	5	6	8	11	7	10	10	9	4	6	2	2	....	....	....
	4	2	1	2	4	4	10	5	5	9	5	5	4	1	1	....	....	....
19	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....
20	4	5	4	4	6	2	5	8	4	5	7	3	5	....	....	1	....	....
	5	2	3	5	3	2	2	1	1	....	4	2	1	1	....	....	....	....
21	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
22	1	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
23	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
24	1	1	1	3	1	5	1	....	4	2	1	1	1	....	....	....	....	....
	1	2	3	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....
25	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Table 24 — *Deaths from each cause (detailed International List) in the year age periods),*

Internat. No.	CAUSE OF DEATH		Age									
			All ages	Under 1 year	1	2	3	4	Under 5 years	5–9	10–14	15–19
	I.— General diseases — *(Continued)*											
26	Pellagra	M	5									
		F	9									
27	Beriberi	M										
		F										
	Tuberculosis	M	3,813	58	57	38	21	17	191	53	34	161
		F	2,677	57	53	32	20	17	179	59	66	229
28	Tuberculosis of the lungs	M	3,313	15	10	6	2	1	34	10	17	131
		F	2,235	15	5	3	5		28	15	45	194
29	Acute miliary tuberculosis	M	73	3	7		1	1	12	3	1	5
		F	54	2	2			1	5	6	2	10
30	Tuberculous meningitis	M	206	32	32	25	15	12	116	27	9	11
		F	191	33	35	26	13	13	120	29	7	8
31	Abdominal tuberculosis	M	99	7	4	5	3	1	20	7	1	7
		F	113	4	7	1	1	1	14	4	9	8
32	Pott's disease	M	38					1	1	4	5	2
		F	29	1		1		2	4	4	1	3
33	White swellings	M	22			1			1		1	3
		F	9		1				1			2
34	Tuberculosis of other organs	M	40		3				3			1
		F	29	1		1	1		3		2	3
35	Disseminated tuberculosis	M	22	1	1	1		1	4	2		1
		F	17	1	3				4	1		1
36	Rickets	M	9	7		1	1		9			
		F	15	5	6	1		1	13			
37	Syphilis	M	277	92	13	1			106	1	1	2
		F	167	67	3	2	1		73	1		1
38	Gonococcus infection	M	10									1
		F	5									1
	Cancer and other malignant tumors	M	1,920	4		2	3		9	4	6	5
		F	2,949		4	1	1	2	8	1	2	3
39	Of the buccal cavity	M	131								1	
		F	32							1		
40	Of the stomach, liver	M	830	1		1	1		3			
		F	893									
41	Of the peritoneum, intestines, rectum	M	324	1					1	2		1
		F	433									
42	Of the female genital organs	F	718								1	1
43	Of the breast	M	9									
		F	484									
44	Of the skin	M	101									
		F	49									
45	Of other organs or of organs not specified	M	525	2		1	2		5	2	5	4
		F	340		4	1	1	2	8		1	2
46	Other tumors (tumors of the female genital organs excepted)	M	20	1			1		2			
		F	13									
47	Acute articular rheumatism	M	129	1		1	3	2	7	14	17	9
		F	144	1		1		2	4	12	15	14
48	Chronic rheumatism and gout	M	32									
		F	67									
49	Scurvy	M										
		F	4	2					2			
50	Diabetes	M	501	1	2	2	3	2	10	13	11	10
		F	627		1	2	1	3	7	7	12	8
51	Exophthalmic goiter	M	11								1	
		F	107	1					1		1	2

State outside New York city, during 1917, *classified by age at death (five for each sex* — (Continued)

Internat. No.	AGE — (*Continued*)																
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–99	10 years and over	Unknown
26	.....	1	.....	1	.....	.....	.....	.....	.....	1	1	.....	1	.....	.....	.....	.....	.....
	.....	1	.....	1	1	3	1	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	392	485	432	446	434	324	292	215	145	103	52	31	16	4	.....	.....	.....	3
	383	381	331	246	186	154	109	92	84	63	46	38	19	7	4	.....	1	.....
28	361	437	400	417	407	304	272	199	134	95	46	29	15	3	.....	.....	.....	2
	358	352	307	227	168	131	97	82	70	59	38	35	18	7	3	.....	1	.....
29	7	13	7	8	7	6	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	7	8	4	4	3	2	1	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....
30	8	11	7	8	3	1	3	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....
	6	6	1	4	3	3	.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	4	10	7	7	10	6	10	4	2	3	.....	.....	1	.....	.....	.....	.....	.....
	8	10	13	7	7	7	6	5	8	2	3	1	1	.....	.....	.....	.....	.....
32	7	4	2	.....	2	2	1	2	2	.....	2	1	.....	1	.....	.....	.....	.....
	2	1	2	.....	1	2	4	.....	1	.....	2	1	.....	.....	1	.....	.....	.....
33	2	3	1	2	1	1	2	2	2	1	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	3	.....	.....	1	.....	1	1	.....	.....	.....	.....	.....	.....
34	5	4	4	2	4	2	3	3	4	3	.....	.....	.....	.....	.....	.....	.....	.....
	2	4	3	1	3	3	1	2	1	1	.....	.....	.....	.....	.....	.....	.....	.....
35	1	2	4	.....	2	.....	.....	3	1	.....	.....	1	.....	.....	.....	.....	.....	1
	.....	.....	1	3	1	3	.....	1	1	.....	1	.....	.....	.....	.....	.....	.....	.....
36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
37	4	14	15	20	21	28	28	13	15	8	.....	1	.....	.....	.....	.....	.....	.....
	2	12	7	12	14	17	7	8	4	5	3	1	.....	.....	.....	.....	.....	.....
38	3	1	.....	2	1	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
	8	16	31	42	64	115	175	263	277	307	265	182	101	34	10	2	.....	1
	.....	615	48	99	194	279	356	405	358	379	345	246	143	52	9	.....	1	.....
39	.....	.....	1	1	7	5	16	24	25	16	18	10	1	4	2	.....	.....	.....
	.....	.....	1	.....	.....	1	.....	4	1	5	6	6	5	1	1	.....	.....	.....
40	2	4	7	25	21	52	81	115	130	151	129	67	29	11	2	.....	.....	1
	.....	.....	7	16	35	62	107	112	117	130	143	94	46	23	1	.....	.....	.....
41	2	2	10	5	13	24	27	37	45	46	46	39	20	3	1	.....	.....	.....
	1	1	6	12	27	26	43	54	61	66	69	40	21	6	.....	.....	.....	.....
42	4	8	20	32	71	101	100	111	76	75	53	37	19	7	2	.....	.....	.....
43	.....	.....	.....	1	.....	.....	2	2	1	1	.....	1	1	.....	.....	.....	.....	.....
	.....	1	5	25	44	63	57	69	54	56	40	37	23	8	2	.....	.....	.....
44	.....	.....	.....	.....	1	5	4	11	9	16	9	12	25	6	2	1	.....	.....
	.....	.....	.....	2	.....	3	4	6	1	7	6	4	10	4	1	.....	1	.....
45	4	10	13	10	22	29	45	74	67	77	63	.....	28	10	3	1	.....	.....
	1	5	9	12	17	23	45	49	48	40	28	53	19	3	2	.....	.....	.....
												28						
46	.....	.....	.....	1	2	3	2	4	2	1	2	.....	1	.....	.....	.....	.....	.....
	.....	.....	.....	1	2	.....	1	.....	.....	3	3	2	1	.....	.....	.....	.....	.....
47	5	3	7	7	4	5	6	11	8	13	4	3	4	1	1	.....	.....	.....
	6	12	5	6	8	9	6	3	11	6	9	9	6	1	2	.....	.....	.....
48	1	.....	1	1	1	1	2	6	1	4	7	2	4	1	.....	.....	.....	.....
	.....	.....	.....	.....	1	2	6	5	15	11	9	8	6	2	1	1	.....	.....
49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
50	11	11	15	16	13	29	46	61	85	63	47	35	18	7	.....	.....	.....	.....
	13	14	18	14	18	31	65	80	102	84	71	48	24	8	3	.....	.....	.....
51	1	.....	1	1	..	2	.....	1	1	2	.....	1	.....	.....	.....	.....	.....	.....
	7	5	11	7	9	20	12	10	8	5	4	3	1	1	.....	.....	.....	.....

Table 24 — *Deaths from each cause (detailed International List) in the year age periods),*

Internat. No.	CAUSE OF DEATH		Age									
			All ages	Under 1 year	1	2	3	4	Under 5 years	5-9	10-14	15-19
	I.— General Diseases — (*Concluded*)											
52	Addison's disease	M	14	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	25	.....	.....	.....	.....	.....	.....	.....	.....	.....
53	Leukemia	M	53	1	.....	.....	1	1	3	2	.....	3
		F	28	1	.....	.....	1	.....	2	.....	.....	2
54	Anemia, chlorosis	M	169	5	1	1	.....	.....	7	.....	.....	3
		F	232	4	3	1	.....	1	9	1	5	2
55	Other general diseases	M	50	24	3	5	2	.....	34	3	1	.....
		F	58	25	2	.....	.....	1	28	1	1	.....
56	Alcoholism (acute or chronic)	M	244	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	31	.....	.....	.....	.....	.....	.....	.....	.....	.....
57	Chronic lead poisoning	M	7	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
58	Other chronic occupation poisonings	M	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
59	Other chronic poisonings	M	7	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	12	.....	.....	.....	.....	.....	.....	.....	.....	1
	II.— Diseases of the nervous system and of the organs of special sense		**8,781**	**242**	**61**	**43**	**31**	**22**	**399**	**85**	**47**	**54**
	Males		4,488	154	29	24	16	17	240	46	23	31
	Females		4,293	88	32	19	15	5	159	39	24	23
60	Encephalitis	M	37	3	.....	.....	1	1	5	5	1	.....
		F	14	1	1	.....	.....	.....	2	2	1	.....
61	Meningitis	M	174	35	12	16	7	6	76	21	6	6
		F	129	23	13	7	4	3	50	18	12	7
	Simple meningitis	M	99	21	7	8	5	4	45	12	6	2
		F	75	13	8	2	3	3	29	6	5	4
	Cerebrospinal meningitis (undefined)	M	46	10	3	6	1	2	22	6	.....	1
		F	36	6	3	4	1	.....	14	8	5	2
	Cerebrospinal fever	M	29	4	2	2	1	.....	9	3	.....	3
		F	18	4	2	1	.....	.....	7	4	2	1
62	Locomotor ataxia	M	107	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	41	.....	.....	.....	.....	.....	.....	.....	.....	.....
63	Other diseases of the spinal cord	M	181	1	2	1	3	6	13	4	3	5
		F	192	2	5	1	6	1	15	6	3	.....
	Acute anterior poliomyelitis	M	22	.....	2	1	3	5	11	3	1	1
		F	17	1	4	1	5	1	12	4	.....	.....
	Other diseases of the spinal cord[1]	M	159	1	.....	.....	.....	1	2	1	2	4
		F	175	1	1	.....	1	.....	3	2	3	.....
64	Cerebral hemorrhage, apoplexy	M	2,867	21	1	.....	1	.....	23	1	.....	.....
		F	3,135	17	1	1	.....	.....	19	.....	2	3
65	Softening of the brain	M	53	.....	.....	.....	.....	.....	.....	.....	.....	1
		F	61	.....	.....	.....	.....	.....	.....	.....	.....	.....
66	Paralysis without specified cause	M	179	1	.....	.....	.....	.....	1	.....	.....	.....
		F	191	.....	.....	.....	.....	.....	.....	.....	.....	.....
67	General paralysis of the insane	M	472	.....	.....	.....	.....	.....	.....	.....	.....	1
		F	150	.....	.....	.....	.....	.....	.....	.....	.....	.....
68	Other forms of mental alienation	M	53	.....	.....	.....	.....	.....	.....	.....	.....	2
		F	74	.....	.....	.....	.....	.....	.....	.....	.....	3
69	Epilepsy	M	131	4	2	1	2	.....	9	6	7	10
		F	111	2	2	1	.....	.....	5	5	.....	8
70	Convulsions (nonpuerperal)	M	3	.....	.....	.....	.....	.....	.....	1	.....	.....
		F	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
71	Convulsions of infants	M	76	64	5	2	1	1	73	3	.....	.....
		F	45	36	4	3	2	.....	45	.....	.....	.....
72	Chorea	M	2	.....	.....	.....	.....	.....	.....	.....	1	.....
		F	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
73	Neuralgia and neuritis	M	14	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	22	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Exclusive of acute poliomyelitis (infantile paralysis).

State, outside New York city, during 1917, *classified by age at death (five for each sex* — (Continued)

Internat. No.	AGE — (*Continued*)																	
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–99	100 years and over	Unknown
52	3	.....	.....	1	1	1	.....	2	1	4	.....	1	.....	.....	.....	.....	.....	.....
	1	.....	2	3	2	2	3	2	1	5	1	2	.....	1	.....	.....	.....	.....
53	5	5	3	3	3	6	4	9	3	2	1	1	.....	.....	.....	.....	.....	.....
	1	.....	2	.....	2	4	1	4	2	4	2	1	.....	.....	.....	.....	.....	.....
54	2	4	5	3	4	13	19	21	24	21	17	18	5	3	.....	.....	.....	.....
	4	4	11	6	14	25	28	26	34	30	13	11	5	4	.....	.....	.....	.....
55	.....	1	.....	1	.....	1	.....	2	1	1	2	3	.....	.....	.....	.....	.....	.....
	3	4	2	1	2	.....	2	.....	3	.....	2	3	4	.....	1	1	.....	.....
56	2	16	21	42	31	37	30	23	14	16	4	3	2	.....	.....	.....	.....	3
	1	.....	3	6	7	4	4	1	3	1	.....	1	.....	.....	.....	.....	.....	.....
57	.....	.....	.....	.....	.....	5	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
58	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
59	.....	.....	.....	2	.....	1	.....	.....	1	.....	.....	3	.....	.....	.....	.....	.....	.....
	.....	.....	1	.....	1	.....	3	.....	2	1	1	1	1	.....	.....	.....	.....	.....
	67	**90**	**163**	**238**	**334**	**419**	**538**	**701**	**868**	**1,097**	**1,222**	**1,107**	**802**	**490**	**121**	**22**	**2**	**5**
	36	58	96	144	198	248	297	380	454	566	585	540	318	167	49	9	1	2
	31	32	67	94	136	171	241	321	414	531	637	567	484	233	72	13	1	3
60	3	1	3	2	2	5	1	4	2	1	1	.....	.....	1	.....	.....	.....	.....
	1	.....	1	1	.....	.....	.....	1	1	1	2	.....	1	.....	.....	.....	.....	.....
61	10	7	4	7	11	4	7	5	2	2	2	1	2	.....	.....	.....	1	.....
	9	.....	5	4	6	2	5	1	.....	3	5	1	1	.....	.....	.....	.....	.....
	3	1	3	3	7	2	3	3	2	2	2	1	2	.....	.....	.....	.....	.....
	5	.....	4	3	3	2	3	1	.....	3	5	1	1	.....	.....	.....	.....	.....
	5	2	.....	2	2	2	2	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
	3	.....	.....	1	2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	2	4	1	2	2	.....	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1	.....	1	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
62	.....	.....	.....	5	5	7	11	17	18	14	14	9	3	3	1	.....	.....	.....
	.....	.....	1	3	3	3	5	5	8	7	3	1	2	.....	.....	.....	.....	.....
63	3	3	3	8	10	11	16	18	14	28	20	12	5	2	2	.....	.....	1
	1	1	4	7	12	11	14	17	17	19	27	17	14	6	1	.....	.....	.....
	1	2	.....	.....	.....	.....	1	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	2	1	3	8	10	11	15	18	14	27	19	12	5	2	2	.....	.....	1
	1	1	4	7	11	11	14	17	17	19	27	17	14	6	1	.....	.....	.....
64	6	5	20	23	75	98	168	255	347	453	472	457	280	137	39	7	.....	1
	3	7	14	28	66	106	168	250	339	436	533	485	408	192	61	12	1	2
65	.....	.....	.....	.....	.....	1	1	3	4	5	11	14	9	4	.....	.....	.....	.....
	.....	1	.....	.....	1	.....	1	3	5	9	13	12	10	5	1	.....	.....	.....
66	1	.....	.....	1	2	4	7	10	19	29	39	32	14	14	5	1	.....	.....
	.....	.....	.....	1	1	8	8	6	18	23	35	31	31	22	6	1	.....	.....
67	1	18	44	77	65	95	61	47	31	15	10	1	3	2	1	.....	.....	.....
	.....	5	14	26	21	19	20	12	3	8	5	5	5	6	1	.....	.....	.....
68	2	5	6	5	4	6	3	7	4	4	1	4	.....	.....	.....	.....	.....	.....
	2	5	7	8	6	7	7	5	7	6	4	4	3	.....	.....	.....	.....	.....
69	7	6	10	10	10	9	13	5	9	5	8	3	.....	3	.....	1	.....	.....
	9	9	15	11	11	5	5	5	4	7	4	4	3	1	.....	.....	.....	.....
70	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
71	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
72	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	2	1	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
73	.....	1	1	.....	5	1	.....	.....	.....	3	2	1	.....	.....	.....	.....	.....	.....
	1	.....	.....	2	2	2	2	4	1	4	1	2	.....	1	.....	.....	.....	.....

Table 24 — *Deaths from each cause (detailed International List) in the year age periods),*

Internat. No	CAUSE OF DEATH		Age									
			All ages	Under 1 year	1	2	3	4	Under 5 years	5–9	10–14	15–19
	II.— Diseases of the nervous system —(*Con'ld*)											
74	Other diseases of the nervous system	M	90	10	3	2	.....	2	17	1	4	3
		F	80	2	1	2	2	1	8	2	5	1
75	Diseases of the eyes and their annexa	M	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	2	.....	.....	1	.....	.....	1	1	.....	.....
76	Diseases of the ears	M	48	15	4	2	1	1	23	4	1	3
		F	40	5	5	3	1	.....	14	5	1	1
	III.— Diseases of the circulatory system		14,160	156	14	10	7	9	196	82	99	87
	Males		7,349	85	8	6	2	6	107	42	39	44
	Females		6,811	71	6	4	5	3	89	40	60	43
77	Pericarditis	M	41	.....	.....	.....	.....	.....	.....	3	1	1
		F	31	1	.....	.....	.....	.....	1	2	1	.....
78	Acute endocarditis	M	330	15	1	3	1	3	23	16	9	8
		F	295	20	3	1	1	1	26	12	15	9
79	Organic diseases of the heart	M	5,416	52	6	2	1	2	63	22	28	33
		F	5,170	34	2	1	4	1	42	25	43	31
80	Angina pectoris	M	356	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	216	.....	.....	.....	.....	.....	.....	.....	1	.....
81	Diseases of the arteries, atheroma, aneurism, etc	M	1,015	2	.....	.....	.....	.....	2	.....	.....	.....
		F	877	.....	.....	.....	.....	.....	.....	.....	.....	.....
82	Embolism and thrombosis	M	126	5	1	.....	.....	.....	6	.....	.....	1
		F	174	1	1	1	.....	.....	3	.....	.....	2
83	Diseases of the veins (varices, hemorrhoids, phlebitis, etc.)	M	13	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	21	2	.....	.....	.....	.....	2	.....	.....	1
84	Diseases of the lymphatic system (lymphangitis, etc.)	M	15	8	.....	1	.....	1	10	1	1	1
		F	19	12	.....	1	.....	1	14	1	.....	.....
85	Hemorrhage; other diseases of the circulatory system	M	7	3	.....	.....	.....	.....	3	.....	.....	.....
		F	8	1	.....	.....	.....	.....	1	.....	.....	.....
	IV.— Diseases of the respiratory system		9,146	1,544	594	193	79	63	2,383	114	59	113
	Males		5,006	921	273	112	41	34	1,381	66	38	68
	Females		4,140	623	231	81	38	29	1,002	48	21	45
86	Diseases of the nasal fossae	M	4	.....	.....	.....	1	.....	1	.....	.....	.....
		F	3	.....	.....	1	.....	.....	1	1	.....	.....
87	Diseases of the larynx	M	27	.....	6	3	2	2	13	1	1	1
		F	25	3	3	3	2	1	12	3	1	1
88	Diseases of the thyroid body	M	5	.....	1	.....	.....	.....	1	.....	.....	.....
		F	30	1	.....	.....	.....	.....	1	.....	.....	.....
89	Acute bronchitis	M	262	132	22	9	3	2	168	5	1	2
		F	272	105	14	3	2	1	125	1	.....	1
90	Chronic bronchitis	M	179	5	1	1	.....	.....	7	.....	.....	.....
		F	213	2	.....	2	.....	.....	4	1	.....	1
91	Bronchopneumonia	M	1,480	594	166	58	21	13	852	22	10	4
		F	1,341	371	138	34	15	10	568	10	5	8
92	Pneumonia	M	2,760	174	69	33	14	17	307	33	24	54
		F	2,041	135	66	33	18	16	268	28	14	29
	Lobar pneumonia	M	2,305	116	61	26	11	13	227	28	21	47
		F	1,609	88	40	20	13	10	171	22	13	26
	Pneumonia (undefined)	M	455	58	8	7	3	4	80	5	3	7
		F	432	47	26	13	5	6	97	6	1	3
93	Pleurisy	M	141	6	6	7	.....	.....	19	5	2	6
		F	96	2	9	5	1	.....	17	3	1	4
94	Pulmonary congestion, pulmonary apoplexy	M	54	7	1	.....	.....	.....	8	.....	.....	1
		F	64	3	1	.....	.....	1	5	.....	.....	1
95	Gangrene of the lung	M	9	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	5	.....	.....	.....	.....	.....	.....	1	.....	.....
96	Asthma	M	26	2	.....	.....	.....	.....	2	.....	.....	.....
		F	31	.....	.....	.....	.....	.....	.....	.....	.....	.....
97	Pulmonary emphysema	M	14	1	.....	.....	.....	.....	1	.....	.....	.....
		F	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
98	Other diseases of the respiratory system (tuberculosis excepted)	M	45	.....	1	1	.....	.....	2	.....	.....	.....
		F	16	1	.....	.....	.....	.....	1	.....	.....	.....

State, outside New York city, during 1917, *classified by age at death (five for each sex* — (Continued)

Internat. No.	Age — (*Continued*)																
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–99	100 years and over	Unknown
74	2	9	5	4	6	4	8	8	4	5	4	4	1	1	.....	.....	.....	.....
	4	3	3	1	5	6	4	10	8	8	2	4	4	.....	2	.....	.....	.....
75	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
76	1	1	.....	2	2	3	1	1	.....	2	1	2	1	.....	.....	.....	.....	.....
	1	1	3	.....	1	2	1	1	3	.....	2	1	2	.....	.....	.....	.....	1
	115	**173**	**199**	**288**	**389**	**541**	**684**	**1,036**	**1,319**	**1,747**	**2,132**	**2,026**	**1,710**	**922**	**336**	**60**	**7**	**12**
	53	76	103	149	207	320	378	592	748	950	1,108	1,023	838	405	132	23	5	7
	62	97	96	139	182	221	306	444	571	797	1,024	1,003	872	517	204	37	2	5
77	2	1	3	2	2	4	1	6	3	4	2	3	2	.....	.....	.....	1	.....
	.....	1	.....	2	.....	.....	.....	3	7	3	1	5	3	.....	1	1	.....	.....
78	7	15	12	26	26	43	43	66	9	10	7	5	4	1	.....	.....	.....	.....
	16	21	21	24	30	17	37	40	5	2	9	3	5	1	2	.....	.....	.....
79	42	52	77	107	152	241	282	437	595	750	832	738	587	283	75	11	3	6
	41	69	66	101	131	180	245	343	465	654	797	795	648	336	128	21	1	5
80	.....	2	6	4	16	21	26	36	53	66	53	46	21	5	1	.....	.....	.....
	.....	.....	2	1	6	8	3	22	29	38	44	26	22	9	4	1	.....	.....
81	.....	2	2	5	7	6	18	33	66	106	192	216	208	113	55	12	1	1
	.....	1	.....	1	5	6	13	23	48	76	138	146	178	162	67	12	1	.....
82	2	3	3	3	4	4	7	12	20	9	21	13	14	3	1	.....	.....	.....
	2	4	5	9	9	9	5	10	12	21	31	25	15	8	2	2	.....	.....
83	.....	1	.....	2	.....	1	1	2	2	2	1	.....	1	.....	.....	.....	.....	.....
	.....	.....	2	1	1	1	3	1	4	2	.....	1	1	1	.....	.....	.....	.....
84	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	1	1	.....	2	.....	.....	.....	.....	.....	.....	.....
85	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	1	.....	.....	.....	.....	.....	.....
	.....	1	.....	.....	.....	.....	.....	1	.....	1	2	2	.....	.....	.....	.....	.....	.....
	158	**181**	**250**	**307**	**369**	**421**	**459**	**522**	**565**	**630**	**724**	**740**	**569**	**390**	**134**	**47**	**7**	**4**
	111	119	155	198	216	308	299	309	327	317	326	323	216	132	45	18	2	2
	47	62	95	109	123	113	160	213	238	313	398	417	353	250	89	29	5	2
86	.....	2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
87	2	.....	.....	1	2	.....	1	.....	2	1	.....	2	.....	.....	.....	.....	.....	.....
	.....	.....	1	.....	.....	.....	1	.....	1	.....	.....	2	2	1	.....	.....	.....	.....
88	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....
	2	1	4	7	3	2	3	1	3	1	.....	2	.....	.....	.....	.....	.....	.....
89	.....	2	1	1	4	5	7	1	5	6	7	15	11	14	3	4	.....	.....
	1	.....	2	3	1	.....	3	3	5	5	20	24	28	32	12	4	2	.....
90	4	1	2	1	2	7	6	7	14	14	25	42	22	13	8	3	1	.....
	2	1	1	3	3	1	2	5	11	27	29	35	42	27	14	4	.....	.....
91	14	6	17	21	28	36	34	47	45	56	86	91	55	38	14	2	1	1
	6	8	11	11	21	12	28	49	48	83	101	129	120	80	29	12	1	1
92	85	100	127	159	192	232	231	229	239	218	185	151	115	55	15	8	.....	1
	31	46	65	79	89	92	114	138	158	180	226	204	139	101	29	9	1	1
	72	90	116	147	172	210	195	194	203	184	153	111	89	35	7	4	.....	.....
	25	41	55	64	83	77	93	117	132	149	185	158	100	74	18	5	.....	1
	13	10	11	12	20	22	36	35	36	34	32	40	26	20	8	4	.....	1
	6	5	10	15	6	15	21	21	26	31	41	46	39	27	11	4	1	.....
93	4	5	3	5	9	15	11	14	13	8	10	7	4	1	.....	.....	.....	.....
	3	5	7	3	5	2	5	9	3	5	8	10	4	2	.....	.....	.....	.....
94	.....	1	.....	1	1	1	.....	2	1	3	8	6	7	9	4	1	.....	.....
	.....	.....	2	.....	.....	1	1	3	1	5	7	8	14	12	4	.....	.....	.....
95	1	1	2	.....	1	.....	1	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	1	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
96	.....	.....	.....	2	1	2	2	3	4	3	2	3	.....	1	1	.....	.....	.....
	1	.....	1	2	1	2	2	3	4	4	6	3	2	.....	.....	.....	.....	.....
97	.....	.....	1	1	.....	1	.....	1	1	2	.....	4	2	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	1	.....
98	1	.....	2	5	5	9	6	4	2	5	3	.....	.....	1	.....	.....	.....	.....
	1	1	1	.....	.....	.....	.....	1	3	3	1	1	1	3	.....	.....	.....	.....

Table 24 — *Deaths from each cause (detailed International List) in the year age periods),*

Internat. No.	CAUSE OF DEATH		Age									
			All ages	Under 1 year	1	2	3	4	Under 5 years	5–9	10–14	15–19
	V.— Diseases of the digestive system		**6,617**	**2,364**	**440**	**118**	**68**	**40**	**3,030**	**120**	**75**	**82**
	Males		3,544	1,359	225	54	39	18	1,695	55	40	47
	Females		3,073	1,005	215	64	29	22	1,335	65	35	35
99	Diseases of the mouth and annexa	M	12	2	1	.....	1	.....	4	5	.....	.....
		F	29	8	2	1	.....	.....	11	.....	.....	1
100	Diseases of the pharynx	M	65	9	7	.....	2	3	21	9	3	3
		F	61	3	4	1	3	.....	11	9	5	4
101	Diseases of the esophagus	M	10	.....	.....	.....	1	.....	1	.....	.....	.....
		F	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
102	Ulcer of the stomach	M	161	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	105	.....	.....	.....	.....	.....	.....	1	.....	1
103	Other diseases of the stomach (cancer excepted)	M	279	95	13	5	1	1	115	1	2	3
		F	255	73	15	5	2	2	97	8	.....	1
104	Diarrhea and enteritis (under 2 years)	M	1,381	1,187	194	.....	.....	.....	1,381	.....	.....	.....
		F	1,062	878	184	.....	.....	.....	1,062	.....	.....	.....
105	Diarrhea and enteritis (2 years and over)	M	320	.....	.....	40	29	9	78	10	3	.....
		F	367	.....	.....	49	18	12	79	13	6	1
106	Ankylostomiasis	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
107	Intestinal parasites	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	4	.....	.....	2	.....	.....	2	.....	.....	.....
108	Appendicitis and typhilitis	M	289	1	3	1	2	3	10	17	23	32
		F	234	2	3	2	4	5	16	23	20	19
109	Hernia, intestinal obstruction	M	344	54	6	5	2	2	69	8	7	5
		F	340	28	4	3	.....	1	36	7	1	1
	Hernia	M	118	6	1	.....	.....	.....	7	.....	.....	.....
		F	126	1	1	.....	.....	.....	2	.....	.....	.....
	Intestinal obstruction	M	226	48	5	5	2	2	62	8	7	5
		F	214	27	3	3	.....	1	34	7	1	1
110	Other diseases of the intestines	M	36	3	.....	.....	.....	.....	3	.....	2	1
		F	34	5	1	.....	.....	.....	6	.....	.....	.....
111	Acute yellow atrophy of the liver	M	10	1	.....	.....	.....	.....	1	.....	.....	.....
		F	12	.....	.....	.....	.....	.....	.....	.....	.....	1
112	Hydatid tumor of the liver	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
113	Cirrhosis of the liver	M	426	1	.....	1	.....	.....	2	.....	.....	.....
		F	225	.....	.....	.....	.....	.....	.....	.....	1	.....
114	Biliary calculi	M	38	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	116	.....	.....	.....	.....	.....	.....	.....	.....	1
115	Other diseases of the liver	M	96	3	.....	1	.....	.....	4	.....	.....	.....
		F	128	4	.....	.....	.....	.....	4	.....	1	1
116	Diseases of the spleen	M	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
117	Simple peritonitis (nonpuerperal)	M	58	3	1	.....	1	.....	5	5	.....	2
		F	72	4	2	1	2	1	10	4	1	4
118	Other diseases of the digestive system (cancer and tuberculosis excepted)	M	15	.....	.....	1	.....	.....	1	.....	.....	.....
		F	22	.....	.....	.....	.....	1	1	.....	.....	.....
	VI.— Nonvenereal diseases of the genito-urinary system and annexa		**7,210**	**48**	**9**	**10**	**6**	**7**	**80**	**32**	**26**	**51**
	Males		3,886	26	6	2	4	3	41	11	11	19
	Females		3,324	22	3	8	2	4	39	21	15	32
119	Acute nephritis	M	293	14	5	.....	4	3	26	7	2	5
		F	238	16	1	6	1	3	27	14	6	7
120	Bright's disease	M	3,140	7	.....	2	.....	.....	9	3	8	13
		F	2,738	5	1	1	1	.....	8	5	7	14
121	Chyluria	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

State, outside New York city, during 1917, *classified by age at death (five for each sex* — (Continued)

Internat No.	AGE — (*Continued*)																
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–99	100 years and over	Unknown
	107	**148**	**151**	**204**	**232**	**253**	**275**	**311**	**309**	**360**	**323**	**286**	**185**	**106**	**45**	**9**	**3**	**2**
	55	80	83	109	137	146	148	154	175	176	175	123	89	45	17	3	1	....
	52	68	68	95	95	117	127	157	125	184	148	163	105	61	28	6	2	2
99	....	....	....	....	....	2	....	....	1	....	....	....	....	....	....	....	....	....
	1	....	3	2	1	3	2	....	....	....	....	2	....	2	....	1	....	....
100	5	4	2	....	3	3	2	1	3	2	3	....	1	....	....	....	....	....
	2	6	3	4	2	3	1	....	1	4	1	1	4	....	....	....	....	....
101	2	....	....	....	1	1	....	....	2	2	1	....	....	....	....	....	....	....
	1	....	....	....	1	....	....	....	....	1	1	....	....	....	....	....	....	....
102	3	10	6	12	16	15	17	13	13	16	21	9	4	1	1	....	1	....
	3	4	3	8	10	6	8	18	8	11	12	9	3	2	....	....	....	....
103	3	1	10	6	9	7	12	11	16	15	24	16	12	10	4	2	....	....
	2	4	3	4	9	6	5	10	9	14	22	12	20	15	11	3	....	....
104	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
105	4	15	6	16	16	17	13	11	19	24	29	24	18	9	7	....	....	....
	4	8	9	12	10	19	9	17	19	29	25	48	31	17	9	1	1	....
106	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
107	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....
108	26	28	22	19	20	23	17	14	18	6	8	4	1	1	....	....	....	....
	17	25	15	16	18	14	19	5	5	10	6	1	3	2	....	....	....	....
109	4	13	14	12	19	11	16	11	24	25	31	25	23	13	4	....	....	....
	6	7	10	17	13	18	17	40	27	45	31	28	18	12	4	1	....	1
	1	6	2	2	4	4	8	6	17	17	17	8	9	7	3	....	....	....
	1	....	3	3	4	7	7	18	16	22	18	11	6	6	1	....	....	1
	3	7	12	10	15	7	8	5	7	18	14	17	14	6	1	....	....	....
	5	7	7	14	9	11	10	22	11	23	13	17	12	6	3	1	....	....
110	....	....	1	4	2	1	2	5	1	3	3	4	2	2	....	....	....	....
	1	....	3	1	3	2	2	1	....	2	4	4	2	1	1	....	1	....
111	1	....	....	....	1	3	....	2	2	....	....	....	....	....	....	....	....	....
	1	2	....	....	2	1	2	....	....	....	1	2	....	....	....	....	....	....
112	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
113	1	3	9	30	37	55	43	69	52	43	40	31	6	3	1	1	....	....
	1	1	6	11	12	15	25	29	23	28	26	28	13	4	1	....	....	1
114	....	....	1	1	1	2	4	6	2	12	3	2	4	....	....	....	....	....
	....	2	4	6	6	7	12	19	15	22	6	9	4	2	1	....	....	....
115	1	3	8	7	6	5	8	4	14	10	6	8	8	4	....	....	....	....
	4	5	3	6	6	14	16	10	16	13	12	9	5	2	1	....	....	....
116	....	....	....	....	....	1	1	....	1	....	1	....	....	....	....	....	....	....
	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
117	2	2	3	2	4	3	7	4	6	7	3	....	1	2	....	....	....	....
	8	3	5	7	....	5	5	6	1	4	....	6	1	2	....	....	....	....
118	1	1	1	....	2	2	....	3	1	1	2	....	....	....	....	....	....	....
	....	1	....	1	1	2	4	4	1	1	1	4	1	....	....	....	....	....
	85	**141**	**158**	**228**	**326**	**424**	**532**	**649**	**766**	**927**	**963**	**832**	**699**	**263**	**97**	**15**	**3**	**3**
	34	69	79	105	156	181	299	375	457	510	550	454	319	145	57	9	3	2
	51	72	79	123	170	243	233	274	309	417	413	378	290	118	40	6	....	1
119	10	22	14	26	27	24	27	24	22	21	18	3	8	6	1	....	....	....
	8	11	13	19	12	13	20	15	11	20	14	15	9	2	1	....	....	....
120	19	43	57	74	120	148	256	334	398	423	456	376	249	104	39	7	3	1
	23	33	44	67	105	183	180	240	287	384	386	350	270	111	36	5	....	....
121	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Table 24 — *Deaths from each cause (detailed International List) in the year age periods),*

Internat. No.	CAUSE OF DEATH		Age									
			All ages	Under 1 year	1	2	3	4	Under 5 years	5–9	10–14	15–19
	VI.— Nonvenereal diseases of the genito-urinary system and annexa—(*Concl'd*)											
122	Other diseases of the kidneys and annexa	M	97	4					4	1		1
		F	55		1			1	2	2	1	2
123	Calculi of the urinary passages	M	24									
		F	6									
124	Diseases of the bladder	M	89		1				1		1	
		F	17			1			1			
125	Diseases of the urethra, urinary abscess,	M	15									
		F										
126	Diseases of the prostate	M	221									
127	Nonvenereal diseases of the male genital organs	M	7	1					1			
128	Uterine hemorrhage (nonpuerperal)	F	4									
129	Uterine tumor (noncancerous)	F	85									1
130	Other diseases of the uterus	F	54								1	2
131	Cysts and other tumors of the ovary	F	49									
132	Salpingitis and other diseases of the female genital organs	F	76									6
133	Nonpuerperal diseases of the breast (cancer excepted)	M										
		F	2	1					1			
	VII.— The puerperal state		682									44
134	Accidents of pregnancy	F	56									2
135	Puerperal hemorrhage	F	53									2
136	Other accidents of labor	F	69									1
137	Puerperal septicemia	F	256									13
138	Puerperal albuminuria and convulsions	F	210									25
139	Puerperal phlegmasia alba dolens, embolus, sudden death	F	35									1
140	Following childbirth (not otherwise defined)	F	3									
141	Puerperal diseases of the breast	F										
	VIII.— Diseases of the skin and of the cellular tissue		269	39	5	1			45	2	4	2
	Males		151	17	3				20	1	3	2
	Females		118	22	2	1			25	1	1	
142	Gangrene	M	78	1					1		1	
		F	55	1		1			2			
143	Furuncle	M	19	3					3		2	1
		F	6	3					3			
144	Acute abscess	M	41	8	2				10	1		1
		F	39	12	1				13	1	1	
145	Other diseases of the skin and annexa	M	13	5	1				6			
		F	18	6	1				7			
	IX.— Diseases of the bones and of the organs of locomotion		146	10	5	1	2	5	23	14	12	5
	Males		82	5	3		1	3	12	5	9	3
	Females		64	5	2	1	1	2	11	9	3	2
146	Diseases of the bones (tuberculosis excepted)	M	74	5	3		1	3	12	3	9	3
		F	48	4	2	1	1	1	9	8	3	1
147	Diseases of the joints (tuberculosis and rheumatism excepted)	M	6							1		
		F	13	1				1	2	1		
148	Amputations	M										
		F										
149	Other diseases of the organs of locomotion	M	2							1		
		F	3									1

State, outside New York city, during 1917, *classified by age at death (five for each sex* — (Continued)

Internat. No.	AGE — (*Continued*)																	
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–99	100 years and over	Unknown
122	3	2	3		4	3	6	8	5	13	13	11	10	8	1			1
	1	4	2	2	8	7	3	2	4	3	5	3	1	2		1		
123			1		2	2		2	3	4	4	3	2	1				
					1	1	2		1						1			
124				1	1	1	4	2	3	6	16	15	16	12	9	1		
					2	1	3			2	1	1	4	1	1			
125	1	2	2	2	1	2		2	1	1			1					
126	1			1	1		5	3	25	41	43	46	33	14	7	1		
127			2	1		1	1			1								
128		1	1	1	1													
129	1	1	3	10	15	19	12	5	2	4	4	2	4	1				1
130	5	6	3	12	6	8	3	4	1			1	2					
131	3	2	2	6	6	1	7	5	3	4	3	6		1				
132	10	14	11	6	14	9	3	3										
133															1			
	135	168	168	115	48	4												
134	10	14	12	11	7													
135	7	12	15	12	3	2												
136	11	14	18	15	9	1												
137	58	67	80	28	9	1												
138	44	49	31	43	18													
139	4	11	12	6	1													
140	1	1			1													
141																		
	4	3	4	4	7	16	12	12	18	20	23	37	29	19	6	1	1	
	4	3	1	3	4	11	9	8	12	12	15	21	10	9	3			
			3	1	3	5	3	4	6	8	8	16	19	10	3	1	1	
142		2		1	2	4	2	6	5	6	12	15	10	8	3			
			1		1		1	1	2	4	5	11	13	9	3	1	1	
143					1	4	2		1	4		1						
							1		1			1						
144	4	1	1	2		2	4	1	5	2	3	4						
			2	1	1	3	1	2	1	4	3	2	4					
145					1	1	1	1	1			1		1				
					1	2		1	2			2	2	1				
	6	6	5	10	6	9	6	9	5	4	8	8	4	3	1	1		1
	6	3	2	6	5	7	3	5	2	2	4	5	1		1			1
		3	3	4	1	2	3	4	3	2	4	3	3	3		1		
146	5	3	2	6	5	7	3	4	1	2	3	4	1					1
		1	3	4	1	1	2	3	2	2	3	1	3	1				
147	1							1			1	1			1			
		2				1		1	1			2		2		1		
148																		
149									1									
							1				1							

Table 24 — *Deaths from each cause (detailed International List) in the year age periods),*

Internat. No.	CAUSE OF DEATH		Age									
			All ages	Under 1 year	1	2	3	4	Under 5 years	5–9	10–14	15–19
	X.— Malformations		774	732	17	2	4	1	756	10	2	3
	Males		413	384	11	.....	4	.....	399	8	1	3
	Females		361	348	6	2	.....	1	357	2	1	.....
150	Congenital malformations (stillbirths not included)	M	413	384	11	.....	4	.....	399	8	1	3
		F	361	348	6	2	.....	1	357	2	1	.....
	Hydrocephalus	M	39	28	4	.....	1	.....	33	4	.....	.....
		F	28	26	.....	.....	.....	1	27	.....	1	.....
	Congenital malformations of the heart	M	267	256	3	.....	2	.....	261	2	1	3
		F	218	209	5	2	.....	.....	216	2	.....	.....
	Other congenital malformations	M	107	100	4	.....	1	.....	105	2	.....	.....
		F	115	113	1	.....	.....	.....	114	.....	.....	.....
	XI.— Early infancy		3,759	3,750	7	2	.....	.....	3,759	.....	.....	.....
	Males		2,189	2,185	4	.....	.....	.....	2,189	.....	.....	.....
	Females		1,570	1,565	3	2	.....	.....	1,570	.....	.....	.....
151	Congenital debility, icterus, and sclerema	M	1,681	1,680	4	.....	.....	.....	1,684	.....	.....	.....
		F	1,241	1,237	2	2	.....	.....	1,241	.....	.....	.....
	Premature birth	M	1,344	1,344	.....	.....	.....	.....	1,344	.....	.....	.....
		F	959	959	.....	.....	.....	.....	959	.....	.....	.....
	Congenital debility, "atrophy," "marasmus," etc	M	340	336	4	.....	.....	.....	340	.....	.....	.....
		F	282	278	2	2	.....	.....	282	.....	.....	.....
152	Other causes peculiar to early infancy	M	498	498	.....	.....	.....	.....	498	.....	.....	.....
		F	324	323	1	.....	.....	.....	324	.....	.....	.....
	Injuries at birth	M	349	349	.....	.....	.....	.....	349	.....	.....	.....
		F	208	207	1	.....	.....	.....	208	.....	.....	.....
	Other causes peculiar to early infancy [1]	M	149	149	.....	.....	.....	.....	149	.....	.....	.....
		F	116	116	.....	.....	.....	.....	116	.....	.....	.....
153	Lack of care	M	7	7	.....	.....	.....	.....	7	.....	.....	.....
		F	5	5	.....	.....	.....	.....	5	.....	.....	.....
	XII.— Old age		614	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Males		246	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Females		368	.....	.....	.....	.....	.....	.....	.....	.....	.....
154	Senility	M	246	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	368	.....	.....	.....	.....	.....	.....	.....	.....	.....
	XIII.— External causes		5,399	108	102	97	49	63	419	233	161	256
	Males		3,999	54	56	58	29	33	230	156	118	206
	Females		1,400	54	46	39	20	30	189	77	43	50
	Suicide	M	489	.....	.....	.....	.....	.....	.....	.....	.....	8
		F	174	.....	.....	.....	.....	.....	.....	1	2	8
155	By poison	M	75	.....	.....	.....	.....	.....	.....	.....	.....	1
		F	56	.....	.....	.....	.....	.....	.....	1	.....	6
156	By asphyxia	M	35	.....	.....	.....	.....	.....	.....	.....	.....	1
		F	28	.....	.....	.....	.....	.....	.....	.....	.....	.....
157	By hanging or strangulation	M	141	.....	.....	.....	.....	.....	.....	.....	.....	1
		F	30	.....	.....	.....	.....	.....	.....	.....	.....	.....
158	By drowning	M	38	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	27	.....	.....	.....	.....	.....	.....	.....	1	1
159	By firearms	M	139	.....	.....	.....	.....	.....	.....	.....	.....	4
		F	19	.....	.....	.....	.....	.....	.....	.....	1	1
160	By cutting or piercing instruments	M	46	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
161	By jumping from high places	M	9	.....	.....	.....	.....	.....	.....	.....	.....	1
		F	2	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Exclusive of injuries at birth.

State, outside New York city, during 1917, *classified by age at death (five for each sex* — (Continued)

Internat. No.	AGE — (*Continued*)																	
	20–24	25–29	30–34	35–39	40–41	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–99	100 years and over	Unknown
	1	1					1											
		1					1											
	1																	
150		1					1											
	1																	
		1					1											
	1																	
151																		
152																		
153																		
							1	4	5	15	44	85	160	172	99	25	4	
							1	1	3	8	20	28	71	63	42	5	4	
								3	2	7	24	57	89	109	57	20		
154							1	1	3	8	20	28	71	63	42	5	4	
								3	2	7	24	57	89	109	57	20		
	424	**412**	**385**	**379**	**353**	**369**	**339**	**297**	**261**	**262**	**221**	**243**	**173**	**125**	**46**	**11**		**28**
	356	351	324	327	299	303	282	241	202	184	133	135	76	32	15	2		27
	68	61	61	52	56	66	57	56	59	78	88	108	97	93	31	9		1
	28	34	51	43	41	58	46	38	49	40	22	16	10		1			1
	16	16	15	18	15	19	17	10	14	12	5	2	3	1				
155	3	6	13	3	7	11	6	8	5	6	4	1	1					
	11	7	6	4	2	3	5	2	4	4			1					
156	2	6		2	2	3	4	1	6	4		2	1					1
	2	3	1	4	2	4	4	2	3	3								
157	6	9	8	10	9	15	21	15	19	9	8	5	6					
		2	2	4	2	3	5	2	4	1	2	1	1	1				
158	2	1	5	6	3	1	6	4	4	3	2				1			
		2	2	3	4	5	1	1	2	2	1	1	1					
159	13	9	16	15	17	17	4	6	11	14	5	7	1					
	3		3	2	3	2	2	2										
160	2	3	7	5	2	9	4	4	4	3	1	1	1					
					2	1		1	1		1							
161			3	2	1		1			1								
			1							1								

Table 24 — *Deaths from each cause (detailed International List) in the year age periods),*

Internat. No.	CAUSE OF DEATH		Age									
			All ages	Under 1 year	1	2	3	4	Under 5 years	5–9	10–14	15–19
	XIII.— External causes — (*Continued*)											
162	By crushing	M	2									
		F	3									
163	Other suicides	M	4									
		F	3									
	Accidental or undefined	M	3,373	47	55	56	28	32	218	155	117	194
		F	1,185	50	46	37	20	30	183	73	41	38
164	Poisoning by food	M	14	1	1	1	1	2	6	3		
		F	19	1	2	2		1	6		3	
165	Other acute poisonings	M	48	3	6	6	1	4	20	1	1	2
		F	32	2	7	2	3		14	1		
166	Conflagration	M	40	2	2		2	2	8	1	1	1
		F	19	1	1	4		1	7	1		
167	Burns (conflagration excepted)	M	166	6	24	19	9	5	63	10	4	2
		F	215	4	22	20	11	15	72	23	3	5
168	Absorption of deleterious gases (conflagration excepted)	M	121	15		1			16	2		3
		F	76	26	1			1	28	1	1	1
169	Accidental drowning	M	445	1	2	11	4	2	20	55	36	42
		F	45		5		1	1	7	3	10	4
170	Traumatism by firearms	M	58							2	10	22
		F	17		1		1	1	3	2	4	2
171	Traumatism by cutting or piercing instruments	M	7		1	1		1	3			1
		F	1									
172	Traumatism by fall	M	543	4	5	8	4	1	22	4	8	16
		F	421	2	2	1		1	6	6	2	4
173	Traumatism in mines and quarries	M	10									
		F										
	Traumatism in mines	M	8									
		F										
	Traumatism in quarries	M	2									
		F										
174	Traumatism by machines	M	99							1	2	9
		F	1									
175	Traumatism by other crushing	M	1,385	1	7	5	7	9	29	67	44	74
		F	245	1	3	7	2	6	19	33	17	20
	Railroad accidents and injuries	M	671		4				4	12	7	34
		F	62			1		1	2	4	9	6
	Street car accidents and injuries	M	112		2		1	1	4	6	1	4
		F	21					2	2	2		2
	Automobile accidents and injuries	M	404	1		5	5	7	18	41	31	21
		F	144	1		5	2	3	11	24	7	10
	Injuries by other vehicles	M	134		1		1		2	7	3	10
		F	13		2	1			3	1		2
	Landslide, other crushing	M	64					1	1	1	2	5
		F	5		1				1	2	1	
176	Injuries by animals	M	39					2	2	1	1	2
		F	10					1	1	1		
177	Starvation	M	4									
		F										
178	Excessive cold	M	38									1
		F	6	1					1			
179	Effects of heat	M	97	9	2			1	12	1		1
		F	38	5	2			1	8			1
180	Lightning	M	12							1		2
		F	1									

State, outside New York city, during 1917, *classified by age at death* (*five for each sex* — (Continued)

Internat. No.	Age — (*Continued*)																	
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–99	100 years and over	Unknown
162			1			1												
		1		1		1												
163			1			1					2							
		1								1	1							
	312	286	252	266	247	236	231	200	153	141	109	119	66	32	14	2		23
	48	41	40	31	39	42	39	46	44	66	82	106	94	92	31	9		
164		1			1	1		1	1									
		1	1		1	2	2		2		1							
165	1	2	2	4	4	1	4	2	2				1					1
	3	3	3	2	2	1		1		1		1						
166	1	2	1	4	3	2	4	1	2	2	5		2					
	1		1	1			1		2	2		1	1	1				
167	8	8	8	11	6	9	7	3	2	5	4	6	2	2	2			1
	5	7	8	7	5	11	9	5	8	8	15	10	8	5	1			
168	6	8	7	10	9	12	8	14	8	9	4	3	1	1				
	3	3	2	2	6	4	3	3	3	2	3	5	3	1	2			
169	65	42	25	36	31	26	22	10	6	10	5	4	3					7
	9		2	1	1	1		1	2	2	1	1						
170	9	3	7			3	1		1									
	1	2	1			1								1				
171		1		1	1													
						1												
172	20	23	38	21	28	32	39	39	37	41	43	57	40	24	10	1		
	2	4	6	4	3	2	10	15	14	32	50	78	73	78	25	7		
173		1	2	1		3	2		1									
		1	2	1		3	1											
							1		1									
174	16	13	11	15	7	6	2	6	3	5	2	1						
				1														
175	156	153	122	125	113	100	108	92	68	40	31	32	11	3				12
	24	17	14	12	17	16	10	18	7	11	5	1	3	1				
	74	88	67	67	71	60	57	43	33	15	12	12	4					11
	6	1	3	3	4	6	2	6	2	5	1	1	1					
	12	4	8	15	4	8	12	13	8	5	2	5	1					
		3		2	3	1	3	2	1									
	46	36	31	25	26	17	29	25	16	13	13	11	3	1				1
	15	12	10	7	10	9	5	9	4	5	3		2	1				
	21	17	11	7	7	9	7	7	8	5	4	4	3	2				
	2	1	1					1		1	1							
	3	13	5	11	5	6	3	4	3	2								
	1																	
176	3	1	2	1	4	6	3	3	3	2	3	1	1					
		1				1		1		3	1	1						
177										1		3						
178	1	1	3	1	3	7	3	3	2	5	1	3	1	2				1
											1	1	2	1				
179	3	2	3	8	5	9	14	7	7	9	8	5	1		2			
		1			2	2	3		3	4	2	4	1	3	3	1		
180	1	1	1	1	1	1		1	1			1						
											1							

Table 24 — *Deaths from each cause (detailed International List) in the year age periods),*

Internat. No	CAUSE OF DEATH		Age									
			All ages	Under 1 year	1	2	3	4	Under 5 years	5–9	10–14	15–19
	XIII— External causes — (*Concluded*)											
181	Electricity (lightning excepted)	M	44	.....	.....	.....	.....	.....	.....	1	2	5
		F	2	.....	.....	.....	.....	.....	.....	1	1	.....
185	Fractures (cause not specified)	M	46	.....	.....	.....	.....	1	1	1	1	2
		F	12	.....	.....	.....	.....	.....	.....	.....	.....	.....
186	Other external violence	M	157	5	5	4	.....	2	16	4	7	9
		F	25	7	.....	1	2	1	11	1	.....	1
	Homicide	M	137	7	1	2	1	1	12	1	1	4
		F	41	4	.....	2	.....	.....	6	3	.....	4
182	By firearms	M	79	.....	.....	.....	.....	.....	.....	.....	1	4
		F	19	.....	.....	.....	.....	.....	.....	.....	.....	4
183	By cutting or piercing instruments	M	20	1	.....	.....	.....	.....	1	.....	.....	.....
		F	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
184	By other means	M	38	6	1	2	1	1	11	1	.....	.....
		F	17	4	.....	2	.....	.....	6	3	.....	.....
	XIV.— Ill-defined diseases		95	17	6	2	1	1	27	2	1	3
	Males		57	10	3	1	1	.....	15	2	.....	2
	Females		38	7	3	1	.....	1	12	.....	1	1
187	Ill-defined organic diseases	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
188	Sudden death	M	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
189	Not specified or ill-defined	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Ill-defined	M	55	10	3	1	1	.....	15	2	.....	2
		F	32	7	3	1	.....	1	12	.....	1	1
	Not specified or unknown	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

State, outside New York city, during 1917, *classified by age at death (five for each sex* — (Concluded)

Interstat. No.	AGE — (*Continued*)																	
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–99	100 years and over	Unknown
181	10	8	3	6	6	2	1											
185	2		6	3	9	3	5	3		4	1	2	2			1		
				1				2	1		2	2	2	1		1		
186	10	11	11	15	16	13	8	15	9	8	2	1	1					1
		2	2		2		1		2	1		1	1					
	16	31	18	18	11	9	5	3		3	2							3
	4	4	6	3	2	5	1		1		1							1
182	10	20	14	10	5	6	3	3		2	1							
	1		3	2	2	4	1		1		1							
183	3	6	3	4	1	1												1
	1	2	1			1												
184	3	5	1	4	5	2	2			1	1							2
	2	2	2	1														1
		2	2	3	3	2	3	2	8	9	5	5	7	2	3			6
			2	3	2	2	1	1	6	5	4	1	2	1	2			6
		2			1		2	1	2	4	1	4	5	1	1			
187																		
		1					1				1	1	1					
188						1			1									
												1						
189																		
			2	3	2	1	1	1	5	5	4	1	2	1	2			6
		1			1		1	1	2	4		2	4	1	1			

Table 25 — *Number of births in each city and the rest of each by color, nativity and nationality of white mothers;*

DISTRICT	Total births	Color or Race				
		White	Negro	Indian	Chinese	Japanese
1 State of New York	**246,453**	**242,694**	**3,652**	**45**	**41**	**21**
2 New York City	**141,564**	**138,516**	**2,990**		**37**	**21**
3 Rest of State	**104,889**	**104,178**	**662**	**45**	**4**	
4 Cities (exc. New York City)	**60,922**	**60,524**	**383**	**13**	**2**	
5 Rural	**43,967**	**43,654**	**279**	**32**	**2**	
6 ALBANY COUNTY	**3,755**	**3,729**	**26**			
7 Albany	2,254	2,230	24			
8 Cohoes	571	571				
9 Watervliet	316	316				
10 Rest of county	614	612	2			
11 ALLEGANY COUNTY	**689**	**686**	**3**			
12 BROOME COUNTY	**2,653**	**2,647**	**6**			
13 Binghamton	1,607	1,601	6			
14 Rest of county	1,046	1,046				
15 CATTARAUGUS COUNTY	**1,413**	**1,403**	**6**	**4**		
16 Olean	513	507	6			
17 Salamanca	174	174				
18 Rest of county	726	722		4		
19 CAYUGA COUNTY	**1,297**	**1,290**	**7**			
20 Auburn	832	825	7			
21 Rest of county	465	465				
22 CHAUTAUQUA COUNTY	**2,427**	**2,422**	**3**	**1**	**1**	
23 Dunkirk	594	593			1	
24 Jamestown	850	847	3			
25 Rest of county	983	982		1		
26 CHEMUNG COUNTY	**1,453**	**1,443**	**10**			
27 Elmira	1,112	1,102	10			
28 Rest of county	341	341				
29 CHENANGO COUNTY	**615**	**612**	**3**			
30 Norwich	160	158	2			
31 Rest of county	455	454	1			
32 CLINTON COUNTY	**1,090**	**1,090**				
33 Plattsburg	262	262				
34 Rest of county	828	828				
35 COLUMBIA COUNTY	**841**	**822**	**19**			
36 Hudson	331	320	11			
37 Rest of county	510	502	8			
38 CORTLAND COUNTY	**575**	**575**				
39 Cortland	293	293				
40 Rest of county	282	282				
41 DELAWARE COUNTY	**912**	**910**	**2**			
42 DUTCHESS COUNTY	**1,925**	**1,876**	**49**			
43 Beacon	212	207	5			
44 Poughkeepsie	847	831	16			
45 Rest of county	866	838	28			

county in the State (outside New York city), during 1917, *classified attendant at birth; also plural and illegitimate births*

DISTRICT	NATIVITY OF WHITE MOTHERS			NATIONALITY OF MOTHERS (FOREIGN-BORN WHITE)				
	Native	Foreign-born	Unknown or not stated	England	Ireland	Germany	Italy	Russia
1 State of New York	**113,797**	**128,884**	**13**	**3,295**	**8,704**	**5,023**	**42,710**	.....
2 New York City	**46,932**	**91,584**	.....	**1,551**	**6,963**	**2,904**	**29,876**	**26,768***
3 Rest of State	**66,865**	**37,300**	**13**	**1,654**	**1,741**	**2,119**	**12,834**	**3,748**
4 Cities (exc. New York City)	**33,861**	**26,661**	**2**	**1,042**	**1,151**	**1,536**	**9,117**	**2,816**
5 Rural	**33,004**	**10,639**	**11**	**612**	**590**	**583**	**3,717**	**932**
6 ALBANY COUNTY	**2,349**	**1,389**	.....	**48**	**79**	**60**	**433**	**167**
7 Albany	1,432	798	.....	24	64	46	274	136
8 Cohoes	300	271	.....	7	7	4	30	11
9 Watervliet	203	113	.....	11	5	4	30	13
10 Rest of county	405	207	.....	6	3	6	99	7
11 ALLEGANY COUNTY	**653**	**31**	**2**	**9**	**1**	**5**	**10**	.....
12 BROOME COUNTY	**1,700**	**947**	.....	**16**	**22**	**8**	**170**	**148**
13 Binghamton	889	712	.....	10	20	7	103	120
14 Rest of county	811	235	.....	6	2	1	67	28
15 CATTARAUGUS COUNTY	**1,130**	**273**	.....	**13**	**9**	**32**	**55**	**9**
16 Olean	347	160	.....	5	5	12	33	3
17 Salamanca	125	49	.....	1	2	8	17	1
18 Rest of county	658	64	.....	7	2	12	5	5
19 CAYUGA COUNTY	**794**	**496**	.....	**31**	**13**	**12**	**168**	**18**
20 Auburn	378	447	.....	19	10	9	161	16
21 Rest of county	416	49	.....	12	3	3	7	2
22 CHAUTAUQUA COUNTY	**1,513**	**908**	**1**	**38**	**9**	**61**	**398**	**45**
23 Dunkirk	303	290	.....	3	4	43	56	37
24 Jamestown	470	377	.....	25	2	3	175	6
25 Rest of county	740	241	1	10	3	15	167	2
26 CHEMUNG COUNTY	**1,217**	**226**	.....	**6**	**20**	**22**	**67**	**21**
27 Elmira	919	183	.....	6	19	19	65	19
28 Rest of county	298	43	.....	.....	1	3	2	2
29 CHENANGO COUNTY	**550**	**61**	**1**	**6**	**4**	**3**	**34**	**1**
30 Norwich	127	31	.....	1	3	1	25	1
31 Rest of county	423	30	1	5	1	2	9	.....
32 CLINTON COUNTY	**987**	**103**	.....	**9**	**4**	**1**	**4**	**12**
33 Plattsburg	243	19	.....	3	1	.....	2	3
34 Rest of county	744	81	.....	6	3	1	2	9
35 COLUMBIA COUNTY	**606**	**216**	.....	**6**	**12**	**8**	**46**	**40**
36 Hudson	197	123	.....	2	4	2	21	29
37 Rest of county	409	93	.....	4	8	6	25	11
38 CORTLAND COUNTY	**479**	**96**	.....	**8**	**3**	**1**	**57**	**15**
39 Cortland	214	79	.....	1	3	1	54	14
40 Rest of county	265	17	.....	7	.....	.....	3	1
41 DELAWARE COUNTY	**841**	**69**	.....	**7**	**2**	**7**	**32**	**8**
42 DUTCHESS COUNTY	**1,267**	**609**	.....	**25**	**37**	**27**	**254**	**67**
43 Beacon	123	84	.....	1	5	2	28	19
44 Poughkeepsie	521	310	.....	11	13	16	106	40
45 Rest of county	623	215	.....	13	19	9	120	8

* Includes Russian Poland.

Table 25 — *Number of births in each city and the rest of each by color, nativity and nationality of white mothers; attendant*

DISTRICT	NATIONALITY OF MOTHERS (FOREIGN-BORN WHITE) — *Continued*						
	Russia Poland	Austria	Austria Poland	Hungary	Poland (not specified)	Canada	Other foreign
1 State of New York	.....	.....	.....	.....	**1,782**	**2,524**	**10,434**
2 New York City	.....	**†14,552**	.....	.....	.....	**424**	**8,546**
3 Rest of State	**2,015**	**5,317**	**1,086**	**1,016**	**1,782**	**2,100**	**1,888**
4 Cities (exc. New York City)	**1,582**	**3,958**	**901**	**804**	**1,336**	**1,244**	**1,174**
5 Rural	**433**	**1,359**	**185**	**212**	**445**	**856**	**714**
6 ALBANY COUNTY	**74**	**267**	**33**	**7**	**69**	**76**	**76**
7 Albany	65	39	28	2	52	15	53
8 Cohoes	4	132	4	2	3	55	12
9 Watervliet	3	28	.....	.....	10	3	6
10 Rest of county	2	68	1	3	4	3	5
11 ALLEGANY COUNTY	.....	**1**	.....	.....	.....	**4**	**1**
12 BROOME COUNTY	**5**	**302**	**2**	**226**	**5**	**6**	**37**
13 Binghamton	3	203	2	215	1	5	23
14 Rest of county	2	99	.....	11	4	1	14
15 CATTARAUGUS COUNTY	**8**	**56**	**10**	**1**	**20**	**19**	**41**
16 Olean	2	41	10	1	12	7	29
17 Salamanca	3	4	.....	.....	4	3	6
18 Rest of county	3	11	.....	.....	4	9	6
19 CAYUGA COUNTY	**7**	**205**	**1**	**5**	**15**	**10**	**11**
20 Auburn	7	192	1	4	14	6	8
21 Rest of county	.....	13	.....	1	1	4	3
22 CHAUTAUQUA COUNTY	**6**	**85**	**4**	.....	**46**	**21**	**195**
23 Dunkirk	6	72	4	.....	39	4	22
24 Jamestown	.....	8	.....	.....	4	9	145
25 Rest of county	.....	5	.....	.....	3	8	28
26 CHEMUNG COUNTY	**2**	**60**	.....	.....	**5**	**8**	**15**
27 Elmira	1	32	.....	.....	4	7	11
28 Rest of county	1	28	.....	.....	1	1	4
29 CHENANGO COUNTY	.....	**2**	.....	.....	.....	**1**	**10**
30 Norwich	.....	.....	.....	.....	.....	.....	.....
31 Rest of county	.....	2	.....	.....	.....	1	10
32 CLINTON COUNTY	.....	**2**	**1**	.....	**1**	**63**	**6**
33 Plattsburg	.....	1	.....	.....	.....	8	1
34 Rest of county	.....	1	1	.....	1	55	5
35 COLUMBIA COUNTY	**12**	**52**	**20**	**7**	**9**	**2**	**2**
36 Hudson	5	33	15	4	5	2	1
37 Rest of county	7	19	5	3	4	.....	1
38 CORTLAND COUNTY	.....	**1**	.....	.....	.....	**5**	**6**
39 Cortland	.....	1	.....	.....	.....	2	3
40 Rest of county	.....	.....	.....	.....	.....	3	3
41 DELAWARE COUNTY	**2**	**4**	.....	.....	.....	.....	**7**
42 DUTCHESS COUNTY	**8**	**89**	**2**	**48**	**7**	**5**	**40**
43 Beacon	.....	11	.....	9	1	2	6
44 Poughkeepsie	6	67	1	33	4	2	11
45 Rest of county	2	11	1	6	2	1	23

† New York City's report for Austria and Russia includes the parts of Poland located respectively and Hungary; Russia = Russia and Russian Poland.

county in the State (outside New York city), during 1917, *classified at birth; also plural and illegitimate births* — (Continued)

DISTRICT	Attendant at Birth				Plural Births		Illegitimate
	Physician	Midwife	Other	None or not stated	Twins	Triplets	
1 **State of New York**	**181,357**	**64,282**	**806**	**8**	**3,131**	**37**	**2,499**
2 **New York City**	**94,039**	**47,525**	.....	.....	**1,110**	**8**	**1,440**
3 **Rest of State**	**87,318**	**16,757**	**806**	**8**	**2,021**	**29**	**1,059**
4 **Cities (exc. New York City)**	**46,159**	**14,442**	**321**	.....	**1,189**	**10**	**726**
5 **Rural**	**41,159**	**2,315**	**485**	**8**	**832**	**19**	**333**
6 ALBANY COUNTY	**3,050**	**687**	**18**	.....	**104**	**4**	**44**
7 Albany	1,793	459	2	.....	58	.....	37
8 Cohoes	475	86	10	.....	24	.....	2
9 Watervliet	272	43	1	.....	8	.....	3
10 Rest of county	510	99	5	.....	14	4	2
11 ALLEGANY COUNTY	**675**	**8**	**6**	.....	**9**	.....	**3**
12 BROOME COUNTY	**2,018**	**609**	**25**	**1**	**49**	.....	**56**
13 Binghamton	1,098	493	16	.....	34	.....	50
14 Rest of county	920	116	9	1	15	.....	6
15 CATTARAUGUS COUNTY	**1,367**	**39**	**7**	.....	**34**	.....	**12**
16 Olean	477	35	1	.....	18	.....	3
17 Salamanca	168	33	3	.....	2	.....	1
18 Rest of county	722	1	3	.....	14	.....	8
19 CAYUGA COUNTY	**1,090**	**191**	**16**	.....	**20**	.....	**12**
20 Auburn	634	185	13	.....	14	.....	9
21 Rest of county	456	6	3	.....	6	.....	3
22 CHAUTAUQUA COUNTY	**2,018**	**382**	**27**	.....	**43**	.....	**18**
23 Dunkirk	338	255	1	.....	16	.....	5
24 Jamestown	739	97	14	.....	16	.....	5
25 Rest of county	941	30	12	.....	11	.....	8
26 CHEMUNG COUNTY	**1,390**	**46**	**17**	.....	**18**	.....	**12**
27 Elmira	1,065	44	3	.....	14	.....	10
28 Rest of county	325	2	14	.....	4	.....	2
29 CHENANGO COUNTY	**612**	**1**	**2**	.....	**7**	.....	**4**
30 Norwich	160	.....	.....	.....	1	.....	2
31 Rest of county	452	1	2	.....	6	.....	2
32 CLINTON COUNTY	**1,072**	**8**	**9**	**1**	**10**	.....	**12**
33 Plattsburg	260	1	1	.....	2	.....	3
34 Rest of county	812	7	8	1	8	.....	9
35 COLUMBIA COUNTY	**725**	**56**	**59**	**1**	**22**	.....	**15**
36 Hudson	231	47	53	.....	6	.....	7
37 Rest of county	494	9	6	1	16	.....	8
38 CORTLAND COUNTY	**566**	**1**	**8**	.....	**10**	.....	**5**
39 Cortland	292	.....	1	.....	4	.....	2
40 Rest of county	274	1	7	.....	6	.....	3
41 DELAWARE COUNTY	**887**	**14**	**11**	.....	**14**	.....	**7**
42 DUTCHESS COUNTY	**1,567**	**341**	**17**	.....	**47**	.....	**20**
43 Beacon	158	54	.....	.....	.....	.....	6
44 Poughkeepsie	615	231	1	.....	20	.....	6
45 Rest of county	794	56	16	.....	27	.....	8

in these countries and Hungary is included with Austria, i.e., Austria = Austria, Austrian Poland

Table 25 — *Number of births in each city and the rest of each color, nativity and nationality of white mothers; attendant*

DISTRICT	Total births	Color or Race				
		White	Negro	Indian	Chinese	Japanese
46 ERIE COUNTY	**16,509**	**16,459**	**37**	**13**	.....	.....
47 Buffalo	13,468	13,429	32	7	.....	.....
48 Lackawanna	926	924	2	.....	.....	.....
49 Tonawanda	205	205	.....	.....	.....	.....
50 Rest of county	1,910	1,901	3	6	.....	.....
51 ESSEX COUNTY	**758**	**757**	**1**	.....	.....	.....
52 FRANKLIN COUNTY	**1,024**	**1,016**	**2**	**6**	.....	.....
53 FULTON COUNTY	**884**	**882**	**2**	.....	.....	.....
54 Gloversville	474	473	1	.....	.....	.....
55 Johnstown	201	200	1	.....	.....	.....
56 Rest of county	209	209	.....	.....	.....	.....
57 GENESEE COUNTY	**841**	**835**	**5**	**1**	.....	.....
58 Batavia	341	339	2	.....	.....	.....
59 Rest of county	500	496	3	1	.....	.....
60 GREENE COUNTY	**453**	**445**	**8**	.....	.....	.....
61 HAMILTON COUNTY	**73**	**73**	.....	.....	.....	.....
62 HERKIMER COUNTY	**1,631**	**1,631**	.....	.....	.....	.....
63 Little Falls	417	417	.....	.....	.....	.....
64 Rest of county	1,214	1,214	.....	.....	.....	.....
65 JEFFERSON COUNTY	**1,694**	**1,693**	.....	**1**	.....	.....
66 Watertown	718	717	.....	1	.....	.....
67 Rest of county	976	976	.....	.....	.....	.....
68 LEWIS COUNTY	**464**	**464**	.....	.....	.....	.....
69 LIVINGSTON COUNTY	**760**	**747**	**13**	.....	.....	.....
70 MADISON COUNTY	**778**	**773**	**3**	**2**	.....	.....
71 Oneida	220	219	.....	1	.....	.....
72 Rest of county	558	554	3	1	.....	.....
73 MONROE COUNTY	**8,354**	**8,332**	**22**	.....	.....	.....
74 Rochester	6,955	6,936	19	.....	.....	.....
75 Rest of county	1,399	1,396	3	.....	.....	.....
76 MONTGOMERY COUNTY	**1,406**	**1,403**	**2**	.....	**1**	.....
77 Amsterdam	971	968	2	.....	1	.....
78 Rest of county	435	435	.....	.....	.....	.....
79 NASSAU COUNTY	**2,524**	**2,483**	**39**	.....	**2**	.....
80 NIAGARA COUNTY	**3,143**	**3,136**	**6**	**1**	.....	.....
81 Lockport	388	387	1	.....	.....	.....
82 Niagara Falls	1,677	1,672	5	.....	.....	.....
83 North Tonawanda	501	501	.....	.....	.....	.....
84 Rest of county	577	576	.....	1	.....	.....
85 ONEIDA COUNTY	**4,565**	**4,558**	**6**	**1**	.....	.....
86 Rome	778	775	3	.....	.....	.....
87 Utica	2,561	2,557	3	1	.....	.....
88 Sherrill	36	36	.....	.....	.....	.....
89 Rest of county	1,190	1,190	.....	.....	.....	.....

county in the State (outside New York city), during 1917, classified by at birth; also plural and illegitimate births — (Continued)

DISTRICT	NATIVITY OF WHITE MOTHERS			NATIONALITY OF MOTHERS (FOREIGN-BORN WHITE)				
	Native	Foreign born	Unknown or not stated	England	Ireland	Germany	Italy	Russia
46 ERIE COUNTY	**9,025**	**7,434**	.....	**234**	**208**	**795**	**1,541**	**639**
47 Buffalo	7,377	6,052	.....	201	194	676	1,342	584
48 Lackawanna	236	688	.....	3	8	21	52	26
49 Tonawanda	146	59	.....	6	.....	9	1	.....
50 Rest of county	1,266	635	.....	24	6	89	146	29
51 ESSEX COUNTY	**614**	**143**	.....	**4**	**3**	.....	**37**	**10**
52 FRANKLIN COUNTY	**869**	**147**	.....	**9**	**4**	.....	**6**	**2**
53 FULTON COUNTY	**595**	**287**	.....	**12**	**14**	**14**	**115**	**20**
54 Gloversville	309	164	.....	11	5	7	89	19
55 Johnstown	92	108	.....	1	9	3	22	.....
56 Rest of county	194	15	.....	.....	.....	4	4	1
57 GENESEE COUNTY	**558**	**277**	.....	**7**	**7**	**17**	**186**	**12**
58 Batavia	205	134	.....	1	1	4	101	7
59 Rest of county	353	143	.....	6	6	13	85	5
60 GREENE COUNTY	**370**	**75**	.....	**3**	**2**	**3**	**31**	**15**
61 HAMILTON COUNTY	**70**	**3**	.....	.....	**2**	.....	.....	.....
62 HERKIMER COUNTY	**927**	**702**	**2**	**26**	**23**	**25**	**227**	**97**
63 Little Falls	144	272	1	2	15	12	48	57
64 Rest of county	783	430	1	24	8	13	179	40
65 JEFFERSON COUNTY	**1,301**	**392**	.....	**29**	**10**	**7**	**91**	**8**
66 Watertown	509	208	.....	15	5	4	66	4
67 Rest of county	792	184	.....	14	5	3	25	4
68 LEWIS COUNTY	**414**	**50**	.....	**3**	.....	**2**	**2**	**5**
69 LIVINGSTON COUNTY	**527**	**220**	.....	**8**	**16**	**4**	**180**	**3**
70 MADISON COUNTY	**625**	**148**	.....	**11**	**5**	**7**	**94**	**3**
71 Oneida	163	56	.....	3	5	4	34	2
72 Rest of county	462	92	.....	8	.....	3	60	1
73 MONROE COUNTY	**4,748**	**3,584**	.....	**204**	**146**	**265**	**1,761**	**414**
74 Rochester	3,713	3,223	.....	161	129	222	1,632	407
75 Rest of county	1,035	361	.....	43	17	43	129	7
76 MONTGOMERY COUNTY	**650**	**753**	.....	**17**	**15**	**33**	**213**	**109**
77 Amsterdam	335	633	.....	15	12	27	159	87
78 Rest of county	315	120	.....	2	3	6	54	22
79 NASSAU COUNTY	**1,354**	**1,129**	.....	**46**	**114**	**50**	**402**	**115**
80 NIAGARA COUNTY	**1,559**	**1,577**	.....	**113**	**34**	**50**	**408**	**223**
81 Lockport	279	108	.....	11	4	2	62	1
82 Niagara Falls	550	1,122	.....	77	27	20	316	180
83 North Tonawanda	237	264	.....	10	2	14	22	39
84 Rest of county	493	83	.....	15	1	14	8	3
85 ONEIDA COUNTY	**2,192**	**2,366**	.....	**97**	**45**	**44**	**995**	**117**
86 Rome	355	420	.....	9	6	8	268	14
87 Utica	1,052	1,505	.....	52	31	27	694	93
88 Sherrill	29	7	.....	4	.....	.....	.....	.....
89 Rest of county	756	434	.....	32	8	9	33	10

Table 25 — *Number of births in each city and the r st of each color, nativity and nationality of white mothers; attendant*

DISTRICT	NATIONALITY OF MOTHERS (FOREIGN-BORN WHITE) — *Continued*						
	Russia Poland	Austria	Austria Poland	Hungary	Poland (not specified)	Canada	Other foreign
46 ERIE COUNTY	**800**	**1,187**	**382**	**311**	**784**	**386**	**167**
47 Buffalo	555	819	261	214	725	340	141
48 Lackawanna	162	215	109	54	22	6	10
49 Tonawanda	.....	7	.....	26	.....	9	1
50 Rest of county	83	146	12	17	37	31	15
51 ESSEX COUNTY	**6**	**5**	**1**	**20**	**40**	**12**	**5**
52 FRANKLIN COUNTY	.....	2	.....	1	.....	**119**	**4**
53 FULTON COUNTY	2	72	.....	**13**	**1**	**4**	**20**
54 Gloversville	2	15	.....	.....	.....	4	12
55 Johnstown	.....	53	.....	13	.....	.....	7
56 Rest of county	.....	4	.....	.....	1	.....	1
57 GENESEE COUNTY	**4**	**16**	**3**	**1**	**8**	**8**	**8**
58 Batavia	4	2	1	.....	7	3	3
59 Rest of county	.....	14	2	1	1	5	5
60 GREENE COUNTY	.....	**17**	.....	.....	**1**	.....	**3**
61 HAMILTON COUNTY	.....	.....	.....	.....	.....	**1**	.....
62 HERKIMER COUNTY	**69**	**143**	**22**	**17**	**13**	**26**	**14**
63 Little Falls	**25**	**74**	**18**	**12**	**1**	**4**	**4**
64 Rest of county	**44**	**69**	4	5	**12**	**22**	**10**
65 JEFFERSON COUNTY	**4**	**46**	.....	**9**	**2**	**169**	**17**
66 Watertown	2	18	.....	6	1	82	5
67 Rest of county	2	28	.....	3	1	87	12
68 LEWIS COUNTY	.....	**12**	**1**	**2**	**2**	**15**	**6**
69 LIVINGSTON COUNTY	.....	**1**	.....	.....	**1**	**3**	**4**
70 MADISON COUNTY	.....	8	.....	1	1	7	11
71 Oneida	.....	1	.....	1	.....	3	3
72 Rest of county	.....	7	.....	.....	1	4	8
73 MONROE COUNTY	**46**	**215**	**17**	**15**	**68**	**228**	**205**
74 Rochester	45	205	14	13	58	179	158
75 Rest of county	1	10	3	2	10	49	47
76 MONTGOMERY COUNTY	**64**	**138**	**84**	**1**	**62**	**8**	**9**
77 Amsterdam	59	122	82	.....	56	6	8
78 Rest of county	**5**	**16**	**2**	**1**	**6**	**2**	**1**
79 NASSAU COUNTY	**81**	**88**	**8**	**16**	**126**	**12**	**71**
80 NIAGARA COUNTY	**122**	**216**	**37**	**36**	**79**	**201**	**58**
81 Lockport	.....	5	1	.....	2	14	6
82 Niagara Falls	108	88	34	4	71	150	47
83 North Tonawanda	12	120	1	29	3	9	3
84 Rest of county	2	3	1	3	3	28	2
85 ONEIDA COUNTY	**137**	**291**	**332**	**3**	**93**	**67**	**145**
86 Rome	3	76	11	.....	9	7	9
87 Utica	119	90	240	2	46	28	83
88 Sherrill	.....	.....	.....	.....	.....	3	.....
89 Rest of county	15	125	81	1	38	29	53

county in the State (outside New York city), during 1917, *classified by at birth; also plural and illegitimate births* — (Continued)

DISTRICT	Attendant at Birth				Plural Births		Illegitimate
	Physician	Midwife	Other	None or not stated	Twins	Triplets	
46 ERIE COUNTY	10,510	5,956	43	.....	309	3	247
47 Buffalo	8,400	5,042	26	.....	259	.....	230
48 Lackawanna	372	546	8	.....	17	.....	12
49 Tonawanda	181	24	.....	.....	6	.....	1
50 Rest of county	1,557	344	9	.....	27	3	4
51 ESSEX COUNTY	749	5	4	.....	30	.....	8
52 FRANKLIN COUNTY	978	35	11	.....	23	.....	8
53 FULTON COUNTY	874	6	4	.....	6	.....	6
54 Gloversville	473	1	.....	.....	4	.....	4
55 Johnstown	200	.....	1	.....	.....	.....	.....
56 Rest of county	201	5	3	.....	2	.....	2
57 GENESEE COUNTY	833	.....	8	.....	30	.....	3
58 Batavia	341	.....	.....	.....	21	.....	3
59 Rest of county	492	.....	8	.....	9	.....	.....
60 GREENE COUNTY	450	1	2	.....	4	3	5
61 HAMILTON COUNTY	68	2	3	.....	.....	.....	1
62 HERKIMER COUNTY	1,306	312	13	.....	23	.....	11
63 Little Falls	278	138	1	.....	.....	.....	10
64 Rest of county	1,028	174	12	.....	23	.....	1
65 JEFFERSON COUNTY	1,654	34	6	.....	33	.....	14
66 Watertown	685	31	2	.....	14	.....	9
67 Rest of county	969	3	4	.....	19	.....	5
68 LEWIS COUNTY	456	2	6	.....	16	.....	1
69 LIVINGSTON COUNTY	679	75	6	.....	12	.....	4
70 MADISON COUNTY	764	3	11	.....	21	.....	6
71 Oneida	215	.....	5	.....	4	.....	.....
72 Rest of county	549	3	6	.....	17	.....	6
73 MONROE COUNTY	7,473	830	51	.....	183	3	75
74 Rochester	6,125	811	19	.....	155	3	60
75 Rest of county	1,348	19	32	.....	28	.....	15
76 MONTGOMERY COUNTY	934	459	13	.....	28	3	9
77 Amsterdam	519	443	9	.....	16	3	6
78 Rest of county	415	16	4	.....	12	.....	3
79 NASSAU COUNTY	2,257	247	19	1	65	.....	13
80 NIAGARA COUNTY	2,551	574	18	.....	73	.....	13
81 Lockport	388	.....	.....	.....	10	.....	.....
82 Niagara Falls	1,314	346	17	.....	39	.....	10
83 North Tonawanda	275	226	.....	.....	10	.....	2
84 Rest of county	574	2	1	.....	14	.....	1
85 ONEIDA COUNTY	3,175	1,356	34	.....	89	4	36
86 Rome	452	321	5	.....	15	.....	9
87 Utica	1,612	939	10	.....	49	1	20
88 Sherrill	36	.....	.....	.....	.....	.....	.....
89 Rest of county	1,075	96	19	.....	25	3	7

Table 25 — *Number of births in each city and the rest of each color, nativity and nationality of white mothers; attendant*

DISTRICT	Total births	Color or Race				
		White	Negro	Indian	Chinese	Japanese
90 ONONDAGA COUNTY	**5,613**	**5,595**	**9**	**9**	.....	.....
91 Syracuse	4,218	4,211	5	2	.....	.....
92 Rest of county	1,395	1,384	4	7	.....	.....
93 ONTARIO COUNTY	**1,138**	**1,130**	**8**	.....	.....	.....
94 Canandaigua	199	196	3	.....	.....	.....
95 Geneva	379	374	5	.....	.....	.....
96 Rest of county	560	560	.....	.....	.....	.....
97 ORANGE COUNTY	**2,273**	**2,247**	**26**	.....	.....	.....
98 Middletown	282	279	3	.....	.....	.....
99 Newburgh	576	567	9	.....	.....	.....
100 Port Jervis	218	218	.....	.....	.....	.....
101 Rest of county	1,197	1,183	14	.....	.....	.....
102 ORLEANS COUNTY	**588**	**587**	**1**	.....	.....	.....
103 OSWEGO COUNTY	**1,500**	**1,500**	.....	.....	.....	.....
104 Fulton	308	308	.....	.....	.....	.....
105 Oswego	553	553	.....	.....	.....	.....
106 Rest of county	639	639	.....	.....	.....	.....
107 OTSEGO COUNTY	**800**	**799**	**1**	.....	.....	.....
108 Oneonta	254	253	1	.....	.....	.....
109 Rest of county	546	546	.....	.....	.....	.....
110 PUTNAM COUNTY	**210**	**208**	**2**	.....	.....	.....
111 RENSSELAER COUNTY	**2,070**	**2,062**	**8**	.....	.....	.....
112 Rensselaer	127	126	1	.....	.....	.....
113 Troy	1,428	1,421	7	.....	.....	.....
114 Rest of county	515	515	.....	.....	.....	.....
115 Rockland COUNTY	**867**	**847**	**20**	.....	.....	.....
116 ST. LAWRENCE COUNTY	**1,853**	**1,847**	**2**	**4**	.....	.....
117 Ogdensburg	341	340	1	.....	.....	.....
118 Rest of county	1,512	1,507	1	4	.....	.....
119 SARATOGA COUNTY	**1,198**	**1,188**	**9**	**1**	.....	.....
120 Saratoga Springs	242	234	7	1	.....	.....
121 Mechanicville	233	232	1	.....	.....	.....
122 Rest of county	723	722	1	.....	.....	.....
123 SCHENECTADY COUNTY	**2,693**	**2,686**	**7**	.....	.....	.....
124 Schenectady	2,366	2,359	7	.....	.....	.....
125 Rest of county	327	327	.....	.....	.....	.....
126 SCHOHARIE COUNTY	**377**	**374**	**3**	.....	.....	.....
127 SCHUYLER COUNTY	**275**	**272**	**3**	.....	.....	.....
128 SENECA COUNTY	**416**	**416**	.....	.....	.....	.....
129 STEUBEN COUNTY	**1,562**	**1,559**	**3**	.....	.....	.....
130 Corning	355	352	3	.....	.....	.....
131 Hornell	290	290	.....	.....	.....	.....
132 Rest of county	917	917	.....	.....	.....	.....
133 SUFFOLK COUNTY	**1,933**	**1,884**	**48**	**1**	.....	.....

county in the State (outside New York city), during 1917, *classified by at birth; also plural and illegitimate births* — (Continued)

DISTRICT	NATIVITY OF WHITE MOTHERS			NATIONALITY OF MOTHERS (FOREIGN-BORN WHITE)				
	Native	Foreign-born	Unknown or not stated	England	Ireland	Germany	Italy	Russia
90 ONONDAGA COUNTY	3,596	1,999	.....	74	94	106	713	266
91 Syracuse	2,581	1,630	.....	58	83	83	569	237
92 Rest of county	1,015	369	.....	16	11	23	144	29
93 ONTARIO COUNTY	854	276	.....	18	14	9	147	2
94 Canandaigua	157	39	.....	2	1	.....	26	1
95 Geneva	248	126	.....	7	9	6	83	.....
96 Rest of county	449	111	.....	9	4	3	38	1
97 ORANGE COUNTY	1,625	622	.....	52	67	17	199	74
98 Middletown	228	51	.....	4	4	2	30	5
99 Newburgh	392	175	.....	12	13	4	70	31
100 Port Jervis	183	35	.....	1	3	3	15	4
101 Rest of county	822	361	.....	35	47	8	84	34
102 ORLEANS COUNTY	416	170	1	31	1	24	88	3
103 OSWEGO COUNTY	1,162	338	.....	19	5	14	107	18
104 Fulton	194	114	.....	1	2	.....	36	3
105 Oswego	377	176	.....	15	2	8	64	11
106 Rest of county	591	48	.....	3	1	6	7	4
107 OTSEGO COUNTY	721	78	.....	10	6	8	25	9
108 Oneonta	215	38	.....	4	1	.....	19	6
109 Rest of county	506	40	.....	6	5	8	6	3
110 PUTNAM COUNTY	154	54	.....	4	5	1	33	3
111 RENSSELAER COUNTY	1,482	579	1	35	75	26	162	67
112 Rensselaer	92	34	.....	5	4	2	15	.....
113 Troy	987	433	1	24	65	16	135	24
114 Rest of county	403	112	.....	6	6	8	12	43
115 ROCKLAND COUNTY	587	260	.....	7	14	18	111	27
116 ST. LAWRENCE COUNTY	1,517	329	1	10	5	2	31	9
117 Ogdensburg	288	52	.....	4	2	1	3	1
118 Rest of county	1,229	277	1	6	3	1	28	8
119 SARATOGA COUNTY	852	336	.....	8	26	11	177	21
120 Saratoga Springs	182	52	.....	2	7	1	27	3
121 Mechanicville	122	110	.....	.....	6	1	87	2
122 Rest of county	548	174	.....	6	13	9	63	16
123 SCHENECTADY COUNTY	1,413	1,273	.....	53	35	72	474	182
124 Schenectady	1,200	1,159	.....	44	31	61	422	178
125 Rest of county	213	114	.....	9	4	11	52	4
126 SCHOHARIE COUNTY	354	20	.....	.....	1	1	10	1
127 SCHUYLER COUNTY	237	35	.....	1	1	.....	30	.....
128 SENECA COUNTY	324	92	.....	4	1	3	66	1
129 STEUBEN COUNTY	1,413	143	3	9	7	8	62	5
130 Corning	284	68	.....	.....	4	5	30	5
131 Hornell	245	45	.....	4	3	2	23	.....
132 Rest of county	884	30	3	5	.....	1	9	.....
133 SUFFOLK COUNTY	1,147	737	.....	49	90	37	148	112

Table 25 — *Number of births in each city and the rest of each color, nativity and nationality of white mothers; attendant at*

DISTRICT	NATIONALITY OF MOTHERS (FOREIGN-BORN WHITE) — *Continued*						
	Russia Poland	Austria	Austria Poland	Hungary	Poland (not specified)	Canada	Other foreign
90 ONONDAGA COUNTY	195	290	22	10	64	124	41
91 Syracuse	179	228	20	7	46	92	28
92 Rest of county	16	62	2	3	18	32	13
93 ONTARIO COUNTY	.....	10	1	.....	.....	21	54
94 Canandaigua	.....	.....	.....	.....	.....	4	5
95 Geneva	.....	.....	.....	.....	.....	7	14
96 Rest of county	.....	10	1	.....	.....	10	35
97 ORANGE COUNTY	25	88	19	37	9	10	25
98 Middletown	1	2	.....	.....	2	.....	1
99 Newburgh	2	22	.....	8	1	4	8
100 Port Jervis	1	5	.....	.....	.....	.....	3
101 Rest of county	21	59	19	29	6	6	13
102 ORLEANS COUNTY	2	1	.....	.....	4	14	2
103 OSWEGO COUNTY	2	112	.....	2	4	38	17
104 Fulton	.....	54	.....	2	2	7	7
105 Oswego	2	52	.....	.....	2	17	3
106 Rest of county	.....	6	.....	.....	.....	14	7
107 OTSEGO COUNTY	2	9	.....	.....	.....	3	6
108 Oneonta	1	1	.....	.....	.....	1	5
109 Rest of county	1	8	.....	.....	.....	2	1
110 PUTNAM COUNTY	.....	3	.....	.....	.....	1	4
111 RENSSELAER COUNTY	19	96	1	2	8	17	71
112 Rensselaer	.....	4	.....	1	1	1	1
113 Troy	14	78	1	1	4	12	59
114 Rest of county	5	14	.....	.....	3	4	11
115 ROCKLAND COUNTY	1	43	.....	15	2	4	18
116 ST. LAWRENCE COUNTY	6	17	6	26	12	196	9
117 Ogdensburg	.....	.....	.....	.....	.....	41	.....
118 Rest of county	6	17	6	26	12	155	9
119 SARATOGA COUNTY	.....	28	2	5	6	31	21
120 Saratoga Springs	.....	3	.....	1	1	3	4
121 Mechanicville	.....	1	.....	.....	1	2	10
122 Rest of county	.....	24	2	4	4	26	7
123 SCHENECTADY COUNTY	151	138	19	12	70	29	38
124 Schenectady	146	127	17	11	67	25	30
125 Rest of county	5	11	2	1	3	4	8
126 SCHOHARIE COUNTY	.....	2	.....	1	.....	1	3
127 SCHUYLER COUNTY	1	1	.....	.....	.....	1	.....
128 SENECA COUNTY	.....	7	.....	.....	.....	4	6
129 STEUBEN COUNTY	.....	12	1	4	7	12	16
130 Corning	.....	10	1	3	4	.....	6
131 Hornell	.....	1	.....	.....	2	5	5
132 Rest of county	.....	1	.....	1	1	7	5
133 SUFFOLK COUNTY	78	77	17	7	73	6	43

county in the State (outside New York city), during 1917, *classified by birth; also plural and illegitimate births* — (Continued)

DISTRICT	ATTENDANT AT BIRTH				PLURAL BIRTHS		
	Physician	Midwife	Other	None or not stated	Twins	Triplets	Illegitimate
90 ONONDAGA COUNTY	**4,976**	**598**	**39**	.....	**81**	.....	**77**
91 Syracuse	3,671	521	26	.....	54	.....	73
92 Rest of county	1,305	77	13	.....	27	.....	4
93 ONTARIO COUNTY	**1,136**	.....	**2**	.....	**27**	.....	**6**
94 Canandaigua	199	.....	.....	.....	5	.....	3
95 Geneva	378	.....	1	.....	6	.....	2
96 Rest of county	559	.....	1	.....	16	.....	1
97 ORANGE COUNTY	**2,123**	**126**	**23**	**1**	**51**	.....	**23**
98 Middletown	276	.....	6	.....	3	.....	2
99 Newburgh	511	60	5	.....	11	.....	3
100 Port Jervis	216	.....	2	.....	9	.....	.....
101 Rest of county	1,120	66	10	1	28	.....	18
102 ORLEANS COUNTY	**548**	**28**	**12**	.....	**15**	.....	**2**
103 OSWEGO COUNTY	**1,440**	**48**	**11**	**1**	**24**	.....	**16**
104 Fulton	308	.....	.....	.....	9	.....	5
105 Oswego	506	41	6	.....	8	.....	3
106 Rest of county	626	7	5	1	7	.....	8
107 OTSEGO COUNTY	**793**	.....	**7**	.....	**9**	.....	**5**
108 Oneonta	253	.....	1	.....	6	.....	1
109 Rest of county	540	.....	6	.....	3	.....	4
110 PUTNAM COUNTY	**207**	**2**	**1**	.....	**2**	.....	.....
111 RENSSELAER COUNTY	**1,835**	**223**	**12**	.....	**24**	.....	**26**
112 Rensselaer	112	13	2	.....	.....	.....	.....
113 Troy	1,219	208	1	.....	20	.....	24
114 Rest of county	504	2	9	.....	4	.....	2
115 ROCKLAND COUNTY	**818**	**44**	**5**	.....	**22**	.....	**3**
116 ST. LAWRENCE COUNTY	**1,820**	**13**	**20**	.....	**27**	**3**	**13**
117 Ogdensburg	337	2	2	.....	10	.....	1
118 Rest of county	1,483	11	18	.....	17	3	12
119 SARATOGA COUNTY	**1,151**	**34**	**13**	.....	**26**	**3**	**14**
120 Saratoga Springs	211	30	1	.....	3	3	6
121 Mechanicville	232	.....	1	.....	2	.....	.....
122 Rest of county	708	4	11	.....	21	.....	8
123 SCHENECTADY COUNTY	**1,810**	**861**	**21**	**1**	**42**	.....	**15**
124 Schenectady	1,535	819	12	.....	40	.....	15
125 Rest of county	275	42	9	1	2	.....	.....
126 SCHOHARIE COUNTY	**360**	**3**	**14**	.....	**10**	.....	**4**
127 SCHUYLER COUNTY	**271**	.....	**4**	.....	**3**	.....	**2**
128 SENECA COUNTY	**405**	**1**	**10**	.....	**8**	.....	**2**
129 STEUBEN COUNTY	**1,554**	**1**	**7**	.....	**14**	.....	**10**
130 Corning	354	.....	1	.....	2	.....	1
131 Hornell	290	.....	.....	.....	6	.....	3
132 Rest of county	910	1	6	.....	6	.....	6
133 SUFFOLK COUNTY	**1,813**	**98**	**22**	.....	**33**	.....	**23**

Table 25 — *Number of births in each city and the rest of each color, nativity and nationality of white mothers; attendant*

DISTRICT	Total births	Color or Race				
		White	Negro	Indian	Chinese	Japanese
134 SULLIVAN COUNTY	573	573	.....	.....	.....	.....
135 TIOGA COUNTY	406	404	2	.....	.....	.....
136 TOMPKINS COUNTY	678	675	3	.....	.....	.....
137 Ithaca	353	351	2	.....	.....	.....
138 Rest of county	325	324	1	.....	.....	.....
139 ULSTER COUNTY	1,358	1,341	17	.....	.....	.....
140 Kingston	480	469	11	.....	.....	.....
141 Rest of county	878	872	6	.....	.....	.....
142 WARREN COUNTY	587	587	.....	.....	.....	.....
143 Glens Falls	298	298	.....	.....	.....	.....
144 Rest of county	289	289	.....	.....	.....	.....
145 WASHINGTON COUNTY	885	880	5	.....	.....	.....
146 WAYNE COUNTY	911	911	.....	.....	.....	.....
147 WESTCHESTER COUNTY	7,676	7,475	201	.....	.....	.....
148 Peekskill, village	289	284	5	.....	.....	.....
149 White Plains	473	448	25	.....	.....	.....
150 Mt. Vernon	902	879	23	.....	.....	.....
151 New Rochelle	704	661	43	.....	.....	.....
152 Ossining, village	211	199	12	.....	.....	.....
153 Port Chester, village	568	561	7	.....	.....	.....
154 Yonkers	2,510	2,469	41	.....	.....	.....
155 Rest of county	2,019	1,974	45	.....	.....	.....
156 WYOMING COUNTY	667	665	2	.....	.....	.....
157 YATES COUNTY	276	274	2	.....	.....	.....

county in the State (outside New York city), during 1917, *classified by at birth; also plural and illegitimate births* — (Continued)

DISTRICT	NATIVITY OF WHITE MOTHERS			NATIONALITY OF MOTHERS (FOREIGN-BORN WHITE)				
	Native	Foreign-born	Unknown or not stated	England	Ireland	Germany	Italy	Russia
134 SULLIVAN COUNTY	**437**	**136**	.....	**2**	**6**	**13**	**4**	**83**
135 TIOGA COUNTY	**381**	**23**	.....	**3**	**3**	**2**	**7**	**4**
136 TOMPKINS COUNTY	**570**	**105**	.....	**6**	**13**	**3**	**17**	**18**
137 Ithaca	291	60	.....	5	11	1	12	8
138 Rest of county	279	45	.....	1	2	2	5	10
139 ULSTER COUNTY	**1,039**	**302**	.....	**13**	**13**	**28**	**147**	**59**
140 Kingston	373	96	.....	4	6	12	33	21
141 Rest of county	666	206	.....	9	7	16	114	38
142 WARREN COUNTY	**495**	**92**	.....	**4**	**16**	**3**	**27**	**14**
143 Glens Falls	232	66	.....	3	10	.....	25	14
144 Rest of county	263	26	.....	1	6	3	2	.....
145 WASHINGTON COUNTY	**730**	**149**	**1**	**11**	**15**	**4**	**58**	**4**
146 WAYNE COUNTY	**695**	**216**	.....	**6**	**5**	**8**	**99**	**3**
147 WESTCHESTER COUNTY	**3,380**	**4,095**	.....	**171**	**357**	**127**	**1,851**	**416**
148 Peekskill, village	193	91	.....	3	6	.....	44	6
149 White Plains	243	205	.....	11	27	9	122	14
150 Mt. Vernon	415	464	.....	17	26	25	308	37
151 New Rochelle	310	351	.....	12	54	9	202	29
152 Ossining, village	106	93	.....	3	13	1	67	4
153 Port Chester, village	204	357	.....	16	14	5	204	45
154 Yonkers	997	1,472	.....	69	124	42	358	139
155 Rest of county	912	1,062	.....	40	93	36	546	142
156 WYOMING COUNTY	**564**	**101**	.....	**4**	**3**	**10**	**17**	**4**
157 YATES COUNTY	**245**	**29**	.....	**5**	.....	**1**	**7**	.....

Table 25 — *Number of births in each city and the rest of each color, nativity and nationality of white mothers; attendant*

DISTRICT	NATIONALITY OF MOTHERS (FOREIGN-BORN WHITE) — *Concluded*						
	Russia Poland	Austria	Austria Poland	Hungary	Poland (not specified)	Canada	Other foreign
134 SULLIVAN COUNTY	.....	18	.....	4	2	.....	4
135 TIOGA COUNTY	.....	2	.....	.....	.....	.....	2
136 TOMPKINS COUNTY	.....	13	.....	13	.....	8	14
137 Ithaca	.....	7	.....	7	.....	6	3
138 Rest of county	.....	6	.....	6	.....	2	11
139 ULSTER COUNTY	2	18	1	4	2	2	13
140 Kingston	1	7	1	2	2	2	5
141 Rest of county	1	11	.....	2	.....	.....	8
142 WARREN COUNTY	.....	1	.....	.....	4	10	13
143 Glens Falls	.....	1	.....	.....	.....	3	10
144 Rest of county	.....	.....	.....	.....	4	7	3
145 WASHINGTON COUNTY	8	27	2	1	3	10	6
146 WAYNE COUNTY	.....	7	.....	.....	.....	11	77
147 WESTCHESTER COUNTY	40	704	25	133	50	49	172
148 Peekskill	.....	22	1	7	.....	.....	2
149 White Plains	.....	10	.....	1	.....	6	5
150 Mt. Vernon	.....	12	.....	6	3	6	24
151 New Rochelle	.....	6	.....	2	1	6	30
152 Ossining	.....	1	.....	.....	1	1	2
153 Port Chester	1	30	15	2	3	5	17
154 Yonkers	33	500	8	99	39	11	50
155 Rest of county	6	123	1	16	3	14	42
156 WYOMING COUNTY	24	9	10	.....	4	11	5
157 YATES COUNTY	.....	1	.....	.....	.....	1	14

county in the State (outside New York city), during 1917, *classified by at birth; also plural and illegitimate births* — (Concluded)

DISTRICT	ATTENDANT AT BIRTH				PLURAL BIRTHS		ILLEGITIMATE
	Physician	Midwife	Other	None or not stated	Twins	Triplets	
134 SULLIVAN COUNTY	**549**	**14**	**10**	.....	**13**	.....	**7**
135 TIOGA COUNTY	**402**	**3**	**1**	.....	**4**	.....	**29**
136 TOMPKINS COUNTY	**665**	**3**	**10**	.....	**15**	.....	**3**
137 Ithaca	352	.....	1	.....	11	.....	2
138 Rest of county	313	3	9	.....	4	.....	1
139 ULSTER COUNTY	**1,303**	**48**	**7**	.....	**20**	.....	**13**
140 Kingston	476	2	2	.....	11	.....	5
141 Rest of county	827	46	5	.....	9	.....	8
142 WARREN COUNTY	**574**	**3**	**9**	**1**	**10**	.....	**5**
143 Glens Falls	296	.....	2	.....	3	.....	3
144 Rest of county	278	3	7	1	7	.....	2
145 WASHINGTON COUNTY	**853**	**26**	**6**	.....	**24**	.....	**5**
146 WAYNE COUNTY	**878**	**25**	**8**	.....	**16**	.....	**6**
147 WESTCHESTER COUNTY	**5,354**	**2,274**	**48**	.....	**149**	**3**	**66**
148 Peekskill	253	32	4	.....	8	.....	5
149 White Plains	385	84	4	.....	12	.....	4
150 Mt. Vernon	594	306	2	.....	9	.....	8
151 New Rochelle	521	178	5	.....	14	.....	5
152 Ossining	157	53	1	.....	6	.....	.....
153 Port Chester	314	253	1	.....	19	.....	2
154 Yonkers	1,562	939	9	.....	46	.....	23
155 Rest of county	1,568	429	22	.....	35	3	19
156 WYOMING COUNTY	**658**	**1**	**8**	.....	**9**	.....	**3**
157 YATES COUNTY	**274**	.....	**2**	.....	**11**	.....	**1**

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THIRTY-EIGHTH ANNUAL REPORT

OF THE

STATE DEPARTMENT OF HEALTH

OF

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OF THE

STATE DEPARTMENT OF HEALTH

STATE OF NEW YORK,

EXECUTIVE CHAMBER,

ALBANY, *March* 15, 1918

To the Legislature:

I have the honor to transmit herewith the thirty-eighth annual report of the State Commissioner of Health for the year 1917.

CHARLES S. WHITMAN

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REPORT OF CHIEF ENGINEER

HERMANN M. BIGGS, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR.— I have the honor to submit herewith the annual report of the Division of Sanitary Engineering for 1917.

The volume of work performed by this Division has been increasing from year to year since the organization of the Division in 1906 and the work carried on during 1917 was not only greater in amount than during any preceding year but more extensive in scope. New lines of work, particularly with reference to the investigation of the sanitary condition of construction and operation of milk pasteurizing plants and the inspection of sanitation at military camps, aviation fields and naval bases within the State have been added to the routine and special work usually performed by this Division. To meet these increments in the routine and special work the engineering force has been increased during 1917 by the addition of one assistant engineer, one engineering draftsman and three inspectors.

A numerical summary of the more important matters which have been disposed of by the Engineering Division during the year 1917 appears in the following table for comparison with the corresponding figures for 1916, the summary for that year being also given:

	1916	*1917*
Letters and other correspondence referred to Engineering Division	3,193	3,217
Communications and reports sent out	4,785	4,853
Plans examined and reported upon	122	125
Investigations of public water supplies	183	130
Investigation of sanitary condition of State institutions	9	25
Investigation of sewage disposal plants	18	15

	1916	*1917*
Investigation of milk pasteurizing plants.....	....	148
Investigation relating to sewerage systems.....	25	16
Conferences held with local officials.....	287	357
Lectures and addresses by staff.....	20	12
Investigation of stream pollution and nuisances.	56	35

Concerning the routine work of the Division as shown by the foregoing table, it may be noted that sections 76 to 84 of the Public Health Law and various provisions of the Town and Village Law place with this Department the general supervision over the design of works for sewerage and sewage disposal and questions of stream pollution. The sections referred to provide that unless a permit for such discharge shall have been issued by the State Commissioner of Health, no sewage or manufacturing wastes shall be discharged into any stream. The law also provides that in case of sewage discharge which creates a nuisance or menace to health the State Commissioner of Health, with the concurrence of the Governor and Attorney-General, may issue an order requiring the discontinuance of such sewage discharge and the construction of proper sewage disposal works. The work carried on under these sections is very important, and, while not constituting the greater part of the entire work of the Division, does embody the bulk of the work specifically required by statute.

In the prosecution of this work during 1917 specific examinations and reports of 150 plans for sewerage and sewage disposal have been made prior to approval of these plans by the Commissioner and in addition general investigations relating to sewerage and sewage disposal have been conducted in several municipalities.

It is obvious that no branch of the work of the Engineering Division is of greater moment in the protection of public health than the work of investigating and supervising the sanitary quality of the public water supply. Following the policy carried out during recent years especial attention has been given to this work in 1917. Five hundred out of a total of 530 public water supplies in the State have now been investigated. Although the number of new supplies investigated in 1917 was only 30, the prosecution of this work involved reinspection of supplies previously inspected and the total number of supplies thus covered was 130.

The full significance of this work of protecting public water supplies was set forth at length in the last annual report of this Department, where it was stated that in 1908, when these investigations were first undertaken, there existed some 400 public water supplies serving a population of 6,200,000 and only 50 of these supplies were receiving any kind of purification treatment, serving a population of approximately 700,000.

At the end of 1917 there exists approximately 530 public water supplies serving a population of about 8,200,000, of which supplies some 110 receive purification, serving a population of 6,800,000. This means that during this decade the population protected by water purification has increased from 700,000 to 6,800,000. In this same period the typhoid fever death rate for the State has decreased from 19.0 in 1906 to 5.6 in 1917, and the greatest factor in the reduction of this typhoid fever mortality has been the increased protection afforded by water purification.

Six sets of "Rules and Regulations for the Protection from Contamination of Public Water Supplies" were enacted during the year by the Commissioner under the provisions of section 70 of the Public Health Law, these rules having been prepared by the Engineering Division following an inspection of the watersheds to which they related.

Many complaints are received each year at the Department regarding public nuisances and cases of stream pollution, and while most of these complaints are referred to local boards of health for suitable action under the powers vested in said boards by the Public Health Law, it is necessary in a large proportion of cases that the complaints be investigated by the Engineering Division, especially where the question of sewerage is involved, or where the public nuisance complained of is one of considerable magnitude, or involves plans which require an engineering examination and a report. During the year about 35 investigations of public nuisance and cases of stream pollution were conducted and recommendations for remedial action made to the local boards of health and to the parties responsible for the nuisance.

One of the new lines of routine work taken up during the year has been the investigation of the efficiency of milk pasteurizing plants. This work has involved a detailed inspection and examination of 148 plants in which milk pasteurizing is carried on.

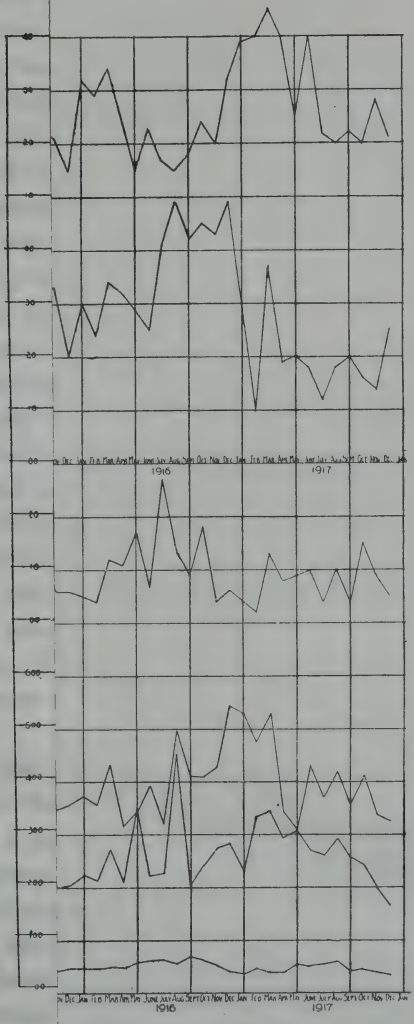
Subsequently recommendations for improvements in the construction, equipment and operation of the plants were made in order that the product might meet the requirements of the Sanitary Code with respect to the bacterial count.

The work of making detailed examinations of the sanitary condition of State institutions was continued in 1917, some 25 institutions being investigated. Reports with recommendations were transmitted to the institution authorities and to the State boards or commissions having general supervision over them.

The work of inspecting the condition and operation of sewage disposal plants has not been prosecuted to the same extent as in recent years owing to the greater necessity of utilizing the services of the engineers of the Division in investigating public water supplies. Some 15 investigations of the condition of operation and efficiency of operation of sewage disposal plants, however, were made as a result of complaints of nuisance in streams or of faulty operation of these plants and recommendations for changes and improvements in the construction and manner of operating the plants made to the local authorities.

An extensive investigation was carried on during the summer and fall of the alleged emission of smoke, gases, fumes and vapors from chemical and other manufacturing plants on the west side of the Hudson river in the borough of Edgewater, N. J., with a view to determining whether such fumes were carried across the river to New York. A further hearing is to be held in this matter for a consideration of the conclusions reached during this investigation.

While the table of routine work given above shows in general a marked increase in the volume of office work in practically every branch of the work listed, the table is by no means complete, nor does it include certain important special investigations which have required a considerable amount of time during the year. The table does not include, for example, the inspection of the sanitary condition of military camps, naval bases and air plane stations and the territory immediately surrounding these camps and stations to which precedence was always given whenever the assistance of the Department was requested by the military authorities for the placing and maintaining of these camps, stations and zones in a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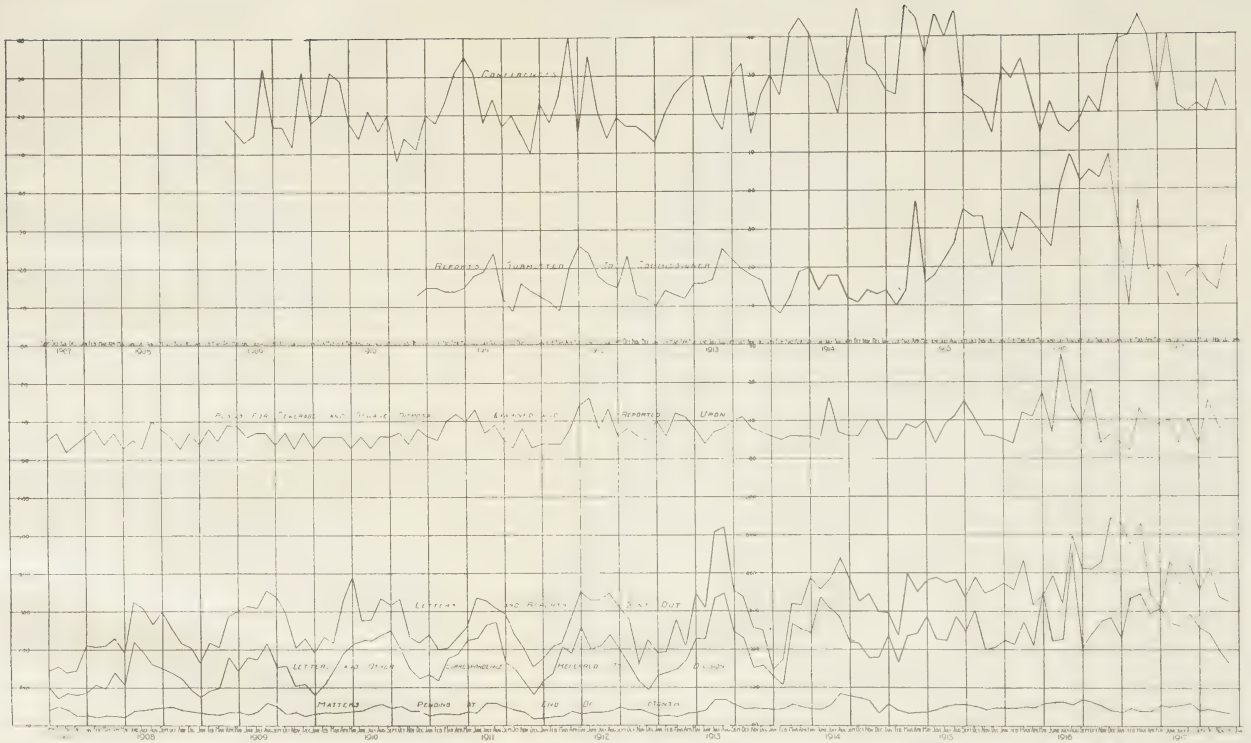


PROGRESS CHART SHOWING VOLUME OF ROUTING WORK OF THE ENGINEERING DIVISION. PLOTTED FROM MONTHLY REPORTS OF THE CHIEF ENGINEER.

sanitary condition. Some 15 camps, naval bases and aviation stations have been thus investigated and in one instance an extensive sanitary survey was made of a neighboring village and subsequent action taken by the Department to require certain sanitary improvements to be made.

In addition to regular water supply inspection, referred to above, it has been necessary for this Division to assist local authorities in providing safety measures for local water supplies by the installation of the Department's emergency chlorine apparatus and to assist in such work in eight municipalities. In one case where a considerably increased number of cases of typhoid fever were occurring, it was necessary for extensive detailed supervision to be given by the Division in the operation of the chlorine apparatus, in order to sterilize the water supply which was found to be contaminated. This supervision continued over a period of two months pending the introduction of a new water supply and required daily visits to the municipality.

Other special work carried on by the Division during the year has consisted in cooperation with the State Architect and State Engineer in determining upon feasible plans for water supply and sewage disposal for State institutions such as Wingdale, the Marcy Division of the Utica State Hospital, Kings Park, the Creedmoor Division of the Brooklyn State Hospital and at various other State institutions. This work has also involved numerous conferences with reference to estimates of appropriations needed to carry out the work.

During the year also the services of a temporary inspector employed in the Department were lent to the Lake George Association for a period of eight weeks, during which time a detailed sanitary survey of some 500 properties adjoining and adjacent to the lake was made.

Another special line of work carried on during the year has been in reference to sites for county tuberculosis hospitals. In order to expedite the work of establishing these hospitals in counties having populations of over 35,000 inspections have been carried on, by the Engineering Division, under arrangements made for such cooperation, covering 100 possible sites for hospitals in 13 counties, the work of the Division relating to the provision

for adequate water supplies of satisfactory sanitary quality and the question of proper disposal of sewage at the sites under consideration.

Attention is again called to the serious handicapping of the work of the Division on account of the inconsistencies, ambiguities and deficiencies in existing laws which limit the effective work which might be done in improving the sanitary quality of public water supplies and in the removal of stream pollution. Legislation, which has been asked for in the past two sessions of the Legislature but not passed, is greatly needed to accomplish more effective results in these lines of work and it is expected that bills will be again introduced in the Legislature during the present session looking toward a more rational and effective basis of control by the State Department of Health.

In previous annual reports I have presented a progress chart showing graphically the work of the Engineering Division since 1907, the year following the organization of the Division. This chart has been extended to include the year 1917 and is again presented. The chart is almost self-explanatory, showing the volume of work by months according to its classified subdivisions, and gives at a glance a seasonal distribution of the work during each year and a ready comparison of the work of the year 1917 with previous years.

The work accomplished during the year is presented more in detail in the following pages, comprising the more important reports of the Division, which have been arranged and indexed in accordance with the classification uniformly adopted for all records of the Engineering Division.

Respectfully submitted,

THEODORE HORTON

Chief Engineer

December 31, 1917

SEWERAGE AND SEWAGE DISPOSAL

EXAMINATION AND APPROVAL OF PLANS FOR SEWERAGE AND SEWAGE DISPOSAL

Under the provisions of the Public Health, Village and Town Laws all plans for sewerage and sewage disposal for municipalities in this State must be submitted to and approved by the Commissioner of Health before the installation or construction of sewers or sewage disposal works is undertaken. The Public Health Law also provides that no sewage, factory wastes or other refuse shall be discharged into any of the waters of this State unless permission shall first have been granted by the State Commissioner of Health and that he may stipulate under what conditions sewage, sewage effluent or industrial wastes may be discharged. The work which the Engineering Division is called upon to do under these provisions of the law comprises one of the greater and more important of its routine duties.

In examining and passing upon plans for sewerage and sewage disposal for municipalities submitted for approval it is necessary not only to study carefully the details of the design and the adequacy and efficiency of the system as a whole but careful consideration must also be given to the degree of the treatment of the sewage provided for and the location of the outlet or outlets in order to preclude the creation of a nuisance in the municipality itself as well as in adjacent municipalities. It is important also that the degree of treatment of sewage shall be so adjusted as to prevent undue contamination of public water supplies that may be taken from the stream or other body of water receiving the effluent.

In addition to the plans for sewerage and sewage disposal for municipalities presented for approval many plans for sewage disposal for factories, private properties, schools and other institutions have been examined and passed upon during the past year. Although many of the disposal plants provided for by such plans have been relatively small it has nevertheless been necessary to give them considerable study and consideration in order to insure that they have been properly designed and that

the plants would satisfactorily perform the functions for which they were intended.

During the year 1917 plans for sewerage and sewage disposal systems or for extensions or modifications to existing systems have been examined and approved in connection with the following places and in each case a report setting forth the results of the examination of the plans and the essential features of the design has been prepared:

ALBION (Orleans County Home)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of plans for sewage disposal for the Orleans County Home at Albion, Orleans County, N. Y., submitted to this Department for approval by the Board of Supervisors on August 18, 1917.

The Orleans County Home is located on level ground about 1¾ miles south of the village of Albion. The total population of the home is generally about 125 people.

The plans for the disposal of the sewage from the home now submitted to this Department for approval contemplate the construction of a sewage disposal plant consisting of a sedimentation tank, a dosing chamber and sand filters, located about 300 feet east of the main building. According to the general layout submitted with the plans of the plant the wells from which the institution takes its water supply appear to be located above and at a sufficient distance from the plant to be safe from contamination either by seepage from the plant itself or from the sewer line leading to the plant.

The sedimentation tank is a closed concrete structure divided into two sections by a longitudinal division wall. Baffles are provided near both the inlet and outlet ends to prevent unnecessary disturbance of the contents and the escape of scum over the outlet weir. Each section of the tank has a capacity of 3,200 gallons, making the average detention period with an assumed sewage flow of 100 gallons per capita per day and with both tanks in use, of about 12 hours. A diverting chamber is provided near the inlet end of the tank so that either section may be used without the other. No provision is made for the removal or discharge of the sludge which will accumulate in the tank. A manhole is provided in the top of each section and it is assumed that the tank will be cleaned by hand at intervals and the sludge disposed of by application to the soil at some part of the grounds remote from the building and from the stream or ditch which receives the natural drainage of the property.

Adjoining the sedimentation tank is a dosing chamber of 800 gallons capacity, the equivalent of about 1½ hours' average flow. This tank is fitted with two 5-inch alternating siphons, arranged to discharge the effluent from the sedimentation tank into the sand filters. The quantity discharged at each dose will be equivalent to a depth of about ⅞ of an inch over the surface of one sand bed.

The sand filters consist of three beds of equal size. Each bed has an area of 0.038 of an acre, making the total area 0.113 of an acre. Figured on the basis of the total area the average rate of filtration will be 110,000 gallons per acre per day, a rate somewhat in excess of that desirable for sand filters to be operated under the conditions existing at Albion. Plants of this type to be operated under these conditions should be designed to provide sufficient area of sand to give a rate of filtration of not over 80,000 gallons per acre per day. The proposed beds are to be built of 6 inches of small field stone, 6 inches of 1½ to ¾-inch screened gravel and 24 inches of clean sharp sand.

The effective size of the sand is not given but it would seem desirable that it should be kept between 0.20 and 0.35 mm. The arrangement of the alternating siphons and of the diverting gates at the sand filters is such that it allows any two of the sand beds to be used at one time, but requires that one bed always remain idle. The sewage is distributed on the beds by wooden troughs, and the effluent collected by tile underdrains laid in broken stone at the bottom of the beds, and discharged into a small ditch which receives the natural drainage from the institution grounds.

This ditch is a tributary of the west branch of Sandy creek, a stream which flows through the village of Albion and empties into Lake Ontario near North Hamlin. No data is furnished regarding the flow of this stream, but the area of the watershed above the village is about 10 square miles. The effluent from the proposed plant will be discharged into the stream at a point 2 miles above the village.

In view of the results of our examination of these plans and after a careful consideration of the essential features of the design, I beg to recommend that the plans be approved and a permit issued for the discharge of the effluent from the sewage disposal plant into a stream on the property of the home in the town of Albion, tributary to Sandy creek on the following conditions:

1. That the area of the sand beds be increased so that the rate of filtration based on an average flow of 100 gallons per capita per day will not be in excess of 80,000 gallons per acre per day.
2. That the layer of sand comprising the filtering material of each of the proposed filter beds shall be not less than 30 inches deep.
3. That the effective size of the sand used in the filter beds be not less than 0.20 mm. or greater than 0.40 mm.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *November* 7, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Supervisors of Orleans county to discharge effluent from the proposed sewage disposal works at the Orleans County Home into the waters of West Branch Sandy creek at the point of discharge shown by the plans within the town of Albion in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That the sewage disposal plant shown by the plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof except as stated in conditions 6 and 7 of this permit.
4. That only sanitary or domestic sewage and no storm water from roofs or other areas shall be admitted to the proposed sewage disposal plant.
5. That no sewage sludge from any part of the disposal plant shall be discharged into West Branch Sandy creek or any other body of water.

6. That the area of the sand filter beds shall be so increased that the rate of filtration, based on an average flow of 100 gallons per acre per day, will not exceed 80,000 gallons per acre per day.

7. That the layer of sand comprising the filtering material of each of the proposed filter beds shall not be less than 30 inches deep.

8. That the effective size of the sand used in the filter beds shall be not less than 0.20 mm. and not greater than 0.40 mm.

M. NICOLL, JR.,
Deputy State Commissioner of Health

November 10, 1917

ALTAMONT

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of the plans for a sewerage system and sewage disposal plant of the village of Altamont, Albany county, submitted to this Department for approval by the trustees of the village on August 27, 1917.

The records of this Department show that plans for a sewerage system and sewage disposal plant consisting of septic tanks and contact beds, were approved by the Department on August 19, 1907. In 1912 an engineer of this Department, at the request of the village trustees, investigated certain insanitary conditions existing in the village and reported under date of June 4, 1912, that no portion of the system for which plans were approved on August 19, 1907, had been constructed but that two 12-inch storm sewers had been built on Main street. He further reported that several houses in the village were provided with cesspools, or septic tanks, and that the effluent from these tanks was being discharged in the ditches and into the 12-inch storm sewers resulting in the occurrence of serious local nuisances at several points.

No steps were taken, however, to abate these nuisances and on June 29, 1916, the Board of Health of Altamont was directed by the Deputy State Commissioner of Health in accordance with section 26 of article 3 of the Public Health Law, to take action to abate the nuisance on Lark street, Main street and Lincoln avenue, caused by the overflow from septic tanks and cesspools into the street gutters and into streams which flow across the streets. The Board of Health failed to abate the nuisance and the matter was turned over to the Attorney-General who applied to the Supreme Court for a writ of mandamus. The date set for the argument of the case was July 21, 1917. On July 18 word was received by this Department that the village trustees had engaged an engineer to prepare plans for a sewerage system and sewage disposal works for the village. In view of this fact an adjournment was granted by the Attorney-General. The plans were prepared, and have now been submitted to this Department for approval.

The sewerage system shown on the plans is a comprehensive system designed to serve the entire village. It is proposed to incorporate in the system the two existing 12-inch sewers on Main street which the engineer reports are in good condition. These sewers are now used to carry storm water but it is intended to disconnect all pipes conducting storm water to these lines, and to carry the storm water in the gutters or in new storm sewers to be constructed later if necessary. The pipes comprising the sewer system vary in size from 8 to 12 inches and are of ample capacity to serve the present population of 800, or any future population that may be reasonably expected to be reached. The grades are in general steep enough to give self-cleansing velocities.

Manholes are provided at intervals of less than 400 feet over the entire system and with the exception of two points on the old 12-inch lines there is no break in the grade or alignment between manholes. The two points mentioned are on Main street between Park place and Lincoln avenue, where the present sewers are laid on curves. The grades, however, are steep and the manholes are close together so that little trouble should be experienced in keeping the sewers in good condition.

At one point on the 12-inch trunk between the village and the disposal works the line passes very close to a spring which it is intended to use at some future time as sources of water supply for the village. Although the spring is on the opposite side of a stream from the sewer, it would seem desirable to construct the trunk line of cast iron pipes with lead joints for a distance of at least 100 feet on each side of the spring.

It is intended to construct, at the present time, only the lines on Lincoln avenue and Lark street and the trunk sewer together with such short section as may be necessary to connect these lines to the present sewers. The present population that this portion of the system will serve is estimated at approximately 250 people.

The proposed sewage disposal plant is to be located on the west bank of the Bozen Kill about ½ mile east of the village and consists of an Imhoff tank, sprinkling filter, chlorination plant, final settling tank and sludge drying bed. The works are designed by the engineer to serve a population of 400 people and arranged in units so that extensions may be made as more houses are connected to the sewers. The estimated flow used by the engineer in designing the plant was 100 gallons per capita per day.

The Imhoff tank is of such size as to give an average detention period of 3 hours in the upper compartment, and to provide a sludge storage capacity of 1 cubic foot per capita in the lower compartment. The velocity through the settling compartment will be 1.7 inches per minute. Eight-inch cast iron draw-off pipes are provided to conduct the sludge to the sludge bed. A concrete dosing tank of 600 gallons capacity or about 20 minutes' average flow, equipped with a 5-inch siphon, is located at the lower end of the tank to receive the effluent. This siphon, while it is large enough to care for the average flow of some 400 people under the head provided, is a little too small to handle satisfactorily the maximum flow that may be received at the plant before additional units are constructed. Its capacity is not as great as the capacity of the rest of the plant. In view of the above facts and of the fact that the cost of 6-inch siphon is only slightly greater than that of the proposed size, it would seem advisable to install a larger siphon. The siphon will discharge the contents of the dosing chamber through 6-inch and 4-inch cast-iron distributors and risers to the nozzle of the sprinkling filter.

This filter has an area of 1,650 square feet and an average depth of 4 feet, 9 inches. The filtering material is to be broken stone from 1 inch to 2 inches in diameter. With the assumed population of 400 people and a flow of 100 gallons per capita per day the operating rate of the filter will be 1 million gallons per acre per day or 220,000 gallons per acre per day per foot of depth. The sprinkler nozzles are set 13 feet on centers and will operate at a head of from 6 feet 6 inches to 1 foot 6 inches. The concrete floor of the bed is covered with 6-inch split tile and drains to a trough at one side from which the effluent flows through a 12-inch tile pipe to the chlorinating tanks.

The engineer's report does not give any information as to the capacity of the chlorinating apparatus or the quantity of chlorine that is to be applied to the filter effluent. In view of the fact that the stream into which the effluent will be discharged is the proposed new source of water supply for the city of Watervliet, it would seem advisable that chlorine should be applied at the rate of not less than 10 parts per million and that the apparatus installed should be of sufficient capacity to allow of the application of chlorine at a rate somewhat in excess of this. The final settling tanks through which the sewage passes after chlorination are of concrete and have a combined capacity of 2,000 gallons, giving a detention period of 1¼ hours with both tanks in use. A 12-inch tile pipe conducts the effluent from the chlorination tank or final settling tank to the Bozen Kill. No means are indicated on the plans for removing the sludge from the chlorination tanks, but the engineer's report states that it is intended to pump it out by hand and dry it on the sludge bed.

The area of the sludge bed is 225 square feet providing about 0.13 of an acre of surface per 1 million gallons average flow. The bed is 12 inches thick at the outside edges and 20 inches thick at the center. It is built of 4 layers of stone and sand varying in size from 2½-inch stone on the bottom to a

medium sand on the top. The sludge is discharged on the bed from 2 8-inch inlets located at the upper end. No provision is made for preventing the incoming sludge from cutting through the sand and finding a direct passage in the under drains. It would seem advisable to provide some form of aprons at the inlets to prevent this from occurring. The sludge bed is underdrained by 4-inch tile 3 feet, 9 inches on centers and the effluent from the underdrains is to be collected by a main drain and conducted to the chlorination tanks. The plant is set at such an elevation that part of the land used in connection with it will be below extreme high water level, as indicated on the plans, and the floor of the sprinkling filter will be covered by 2 feet of water during the flood periods. The tops of all the tanks and of the sludge bed embankment are, however, above maximum high water level and since the periods of extreme high water occur at infrequent intervals, the conditions while undesirable, will not interfere seriously with the operation of the plant. It would seem advisable, however, in view of the above facts to arrange the plant so that the elevation of the floor of the filter will be above high water. An embankment is shown on the plans surrounding the entire plant and evidently intended to protect it from high water. This embankment is unnecessarily high, the top elevation being 8 feet above high water. It does not seem to be protected in any manner from the wash of the stream. The area enclosed by the embankment is not drained and is so arranged that it forms a basin in which water from the adjacent hill will collect. Some provision should be made for preventing the run off from this hill from entering the basin, and if found necessary drains should be provided through the embankment fitted with flat valves to prevent the water of the stream from backing into the enclosure.

In view of the results of our examination of these plans and after careful consideration of the essential features of the design, and local and general requirements with respect to the proper methods of disposal of sewage from the proposed system, I beg to recommend that these plans be approved and a permit be issued allowing the discharge of effluent from the proposed sewage disposal plant into the Bozen Kill in the town of Guilderland on the following conditions:

1. That before the spring near the proposed sewage disposal plant is used as a source of water supply for the village, the tile sewer for 100 feet on each side of it shall be replaced by a sewer of cast-iron pipe laid with lead joints.
2. That aprons be provided on the sludge bed to prevent the incoming sludge from cutting through the bed and finding a direct passage to the underdrains.
3. That the size of the siphon in the dosing chamber be increased to not less than 6 inches.
4. That the chlorinating apparatus installed have sufficient capacity to allow the application of chlorine at the rate of 15 pounds per day.
5. That the plant be so arranged that the floor of the filter will be above extreme high water.
6. That chlorine be applied to the effluent from the plant at all times at the rate of not less than 10 parts per million.
7. That an additional unit of the disposal plant be constructed and put in operation before the flow of sewage reaching the plant has increased materially above that contributed by 600 persons.

Respectfully submitted,

THEODORE HORTON,

ALBANY, N. Y., *September* 5, 1917 *Chief Engineer*

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public

Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Trustees of the village of Altamont to discharge effluent from the sewage disposal works of the village amended plans for which have this day been approved, into the waters of the Bozen Kill at the point of discharge shown by the plans within the town of Guilderland in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewers and sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans and approved amendments thereof except as hereinafter provided.
4. That only sanitary sewage and no storm or surface water from streets, roofs or other areas shall be admitted to the proposed sewers and sewage disposal works.
5. That no sewage scum or sludge from any part of the disposal works shall be discharged into the Bozen Kill or any other watercourse.
6. That if at any time in the future the spring near the proposed sewage disposal plant is used as a source of water supply for the village, the tile sewer for 100 feet each side of such spring shall first be replaced by a sewer of cast-iron pipe laid with lead joints.
7. That whenever found necessary by the State Commissioner of Health an adequate drain provided with flap valves shall be constructed through the embankment surrounding the disposal works.
8. That whenever required by the State Commissioner of Health the sewers on Main street shall be reconstructed in such a manner as to provide straight alignments between manholes.
9. That aprons shall be provided on the sludge bed at the point of discharge of the sludge drain.
10. That the size of the siphon in the dosing chamber shall be increased to not less than 6 inches.
11. That the chlorinating apparatus installed shall have sufficient capacity to allow the application of chlorine at the rate of 15 pounds per day and that chlorine shall be at all times properly applied to the effluent from the plant at the rate of not less than 10 parts of available chlorine per million parts of sewage effluent.
12. That the sewage disposal works shall be so constructed that the floor of the filter shall be above extreme high water level.
13. That additional units of the sewage disposal works comprised by settling tank, sprinkling filters, final settling tanks and chlorination apparatus shall be constructed in accordance with plans satisfactory to this Department and put in operation each time the flow of sewage reaching the plant is increased materially above that contributed by 600 persons.

M. NICOLL, JR.,
Deputy State Commissioner of Health

October 5, 1917

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of amended plans for sewage disposal for the village of Altamont, Albany County, N. Y., submitted to this Department for approval by the Village Engineer on behalf of the Trustees of the Village on October 29, 1917.

The original plans for this sewage disposal plant were approved by this Department on October 5, 1917, and a report covering the matter was submitted to you under date of September 5, 1917.

A permit for the discharge of sewage from the disposal plant into the waters of the Bozen Kill was issued to the Village Trustees under date of October 5, 1917, and contained in addition to the usual revocation and modification clauses the following conditions:

1. That both the sewers and sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans and approved amendments thereof except as hereinafter provided.
2. That only sanitary sewage and no storm or surface water from streets, roofs or other areas shall be admitted to the proposed sewers and sewage disposal works.
3. That no sewage scum or sludge from any part of the disposal works shall be discharged into the Bozen Kill or any other watercourse.
4. That if at any time in the future the spring near the proposed sewage disposal plant is used as a source of water supply for the village, the tile sewer for 100 feet each side of such spring shall first be replaced by a sewer of cast-iron pipe laid with lead joints.
5. That whenever found necessary by the State Commissioner of Health an adequate drain provided with flap valves shall be constructed through the embankment surrounding the disposal works.
6. That whenever required by the State Commissioner of Health the sewers on Main street shall be reconstructed in such a manner as to provide straight alignments between manholes.
7. That aprons shall be provided on the sludge bed at the point of discharge of the sludge drain.
8. That the size of the siphon in the dosing chamber shall be increased to not less than 6 inches.
9. That the chlorinating apparatus installed shall have sufficient capacity to allow the application of chlorine at the rate of 15 pounds per day and that chlorine shall be at all times properly applied to the effluent from the plant at the rate of not less than 10 parts of available chlorine per million parts of sewage effluent.
10. That the sewage disposal works shall be so constructed that the floor of the filter shall be above extreme high water level.
11. That additional units of the sewage disposal works comprised by settling tank, sprinkling filters, final settling tanks and chlorination apparatus shall be constructed in accordance with plans satisfactory to this Department and put in operation each time the flow of sewage reaching the plant is increased materially above that contributed by 600 persons.

The amended plans contemplate only the relocation of the plant on higher ground about 400 feet southeast of the original location. No change is made in the size or form of the tanks or beds, nor in the relative position or elevation of any tank, bed or appurtenance connected with the disposal works. The elevation of the plant as relocated will be approximately 30 feet higher than originally planned. This will place all parts of the plant well above extreme high water, and do away with all danger of water backing into any part of the works and interfering with the operation of the plant.

At the new location the plant will be surrounded by a high bank as at the old site, and some means of draining this enclosure should be provided.

The raising of the elevation of the plant of course decreases the grade of the trunk sewer connecting the street sewers at Indian Ladder Road and Main street to the inlet of the sedimentation tank. The new grade to this 12-inch line will be 0.25 per cent. which is sufficient, if the line is properly laid, to provide a satisfactory self-cleansing velocity and sufficient capacity to care for the needs of the village for a reasonable future period.

In view of the results of our examination of these amended plans and after careful consideration of the essential features of the design and local requirements, I beg to recommend that the plans be approved. No permit for the

discharge of effluent from this plant into the waters of the State is necessary as the changes contemplated by the amendments affect only the location of the plant, and not the method of treatment or the quantity of sewage discharged. The permit issued to the Trustees of the Village of Altamont under date of October 5, 1917, for the discharge of the effluent from the sewage disposal works of the village into the waters of the Bozen Kill in the town of Guilderland applies to the discharge of effluent from this plant.

Respectfully submitted,

THEODORE HORTON,

ALBANY, N. Y., *October* 31, 1917 *Chief Engineer*

The revised plans were approved November 1, 1917.

AMHERST (Sewer District No. 1)

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on our examination of revised plans for sewerage and sewage disposal for Sewer District No. 1, town of Amherst, Erie county, resubmitted to this Department for approval by the engineer for the district on February 3, 1917. Application from the Town Board asking for the approval of plans was submitted under date of May 9, 1916.

The records of the Department show that original plans for sewerage and sewage disposal for a portion of this district including an area of about 2 square miles situated in the southwestern portion of the Town of Amherst adjacent to the city of Buffalo were first submitted for approval on May 27, 1916. These plans provided for a comprehensive sanitary sewer system and for a sewage disposal plant comprising a pumping station, Imhoff tank, sprinkling filter and sludge drying bed to be located near Black creek, a small tributary of Ellicott creek.

After a careful examination of these plans by the Engineering Division a report was submitted to Commissioner Biggs under date of July 19, 1916, setting forth the results of the examination and making recommendations for certain modifications and additions to the plans before their final acceptance. The plans were accordingly returned to the designing engineer on July 19, 1916, with the recommendation that they be revised in the following respects:

1. That the slopes of the 8-inch sewers be not less than .35 per cent and that the slope of the 10-inch sewers be not less than .25 per cent.
2. That the design of the settling tank be so changed as to provide for a slope of the bottom of the sludge compartment of not less than 1 on 2, and that the location of the sludge pipe be shown on the cross sections.
3. That the effluent pipe be extended to Ellicott creek.
4. That the disposal plant be so designed as to permit of installing final settling tanks in the future if necessary.
5. The pumping station and equipment be shown in detail and that duplicate power and pumping equipment of sufficient capacity to care for the maximum flow of sewage with one unit in reserve be provided.
6. That the walls and partitions of the tank be carried up to an elevation of 2 and preferably 3 feet above the flow line of the tank.
7. That full details and dimensions of settling tank be shown.
8. That the size of the dosing siphon in the dosing tank be shown.
9. That a valve be placed at the upper end of each main distributor of the sprinkling filter.
10. That the set of plans for filing in this office be on print cloth.

On December 26, 1916, revised plans for sewerage and sewage disposal for sewer district No. 1 of the town of Amherst covering not only the area provided for by the original plans but so extended on the north and west as to include a total area of about 7 square miles were submitted. Although these

plans had been designed in general accordance with the requirements referred to above they were lacking in details and were returned for revision on January 15, 1917, after a conference with the designing engineer in this office. As noted above revised plans were resubmitted for approval on February 3, 1917.

According to the report of the designing engineer submitted with the plans the present population of the sewer district is about 750. The ultimate future population is estimated by the engineer at from 25,000 to 30,000. Based on an average population of 10 persons per acre, which is possibly somewhat high owing to the large size lots in a large portion of the sewer district, the probably ultimate population that will be tributary to the sewer system within the sewer district will be about 40,000.

Sewer system

The proposed sewer system which has been designed on the separate plan covers practically all the present streets and highways in the sewer district. The sewers vary in size from 8 to 36 inches in diameter and are designed with slopes sufficiently steep to provide self-cleansing velocities in them when flowing full and half full. Manholes are to be provided at the upper ends of all sewers, at the intersection of sewers, at all points of change of slope and alignment and at intermediate points on straight alignments not more than about 400 feet apart on small size sewers. On the large 36-inch outfall sewer the spacing between adjacent manholes in one or two cases exceeds 800 feet.

The lower portion of the main outfall sewer, consisting of 33-inch and 36-inch pipe appears to have been somewhat over designed with respect to necessary capacities. If desired a reduction of the size of this sewer to 30-inch and 33-inch respectively would still provide for sewage contribution from 40,000 persons in the district on the basis of 250 gallons per capita daily with the sewer flowing full, which is a permissible basis of design for a main trunk sewer under the conditions obtaining with respect to probable development of the district.

The proposed sewers have been designed to care for the probable ultimate future population within the sewer district and are, therefore, much larger than necessary to care for the flow that will obtain in the immediate future. There will be a tendency, therefore, for the large size sewers to silt up after they are first constructed due to the small contribution of sewage and the consequent low depth of flow and the sewers will have to be cleaned at regular intervals until sufficient sewage is tributary to them to provide for self-cleansing velocities in the sewers. This, however, is not a serious objection and one that cannot well be avoided.

Pumping

The plans provided for two pumping stations, one near the intersection of Albion avenue and Eggert road marked Pumping Station No. 1, and the other at the disposal plant marked Pumping Station No. 2. According to the plans practically all of the sewage of the sewer district west of Eggert road including approximately ¼ of the entire sewer district is to be conveyed by gravity flow to Pumping Station No. 1 at which it will be pumped against a head of about 22 feet into the manhole on the main outfall sewer. It would appear from the plans that the pumping of the sewage from the greater portion of this area could be avoided by the construction of a high level intercepting sewer extending from the westerly line of the sewer district through private property approximately on line with Fremont street. This, however, would require the securing of additional rights of way through private property. At Pumping Station No. 2 it is proposed to pump the entire sewage of the sewer district against a head of about 40 feet into the settling tank of the disposal plant. Here again it would appear that the sewer system could be so modified or the disposal plant so located as to permit of conveying the sewage from the greater portion of the sewer district by gravity flow to

and through the disposal plant by the construction of a high level intercepting sewer, and possibly an inverted siphon. The design, therefore, does not appear to be economical in this respect inasmuch as it provides for the pumping of the entire sewage once and the sewage from about ¼ the area twice but it is realized that there may be other factors than first cost which have influenced the design such as, possibly, difficulty in securing rights of way.

Pumping station no. 1

This pumping station which is to be located near the intersection of Albion avenue and Eggert road is to be provided with a pumping equipment consisting of two 3-inch centrifugal pumps located in separate pump wells and having a capacity of 200 gallons per minute each. One of the pumps is to be driven by means of a 5 horsepower electric motor which is presumably to be operated automatically and the other pump to be operated by a gasoline engine. The pumps are to be protected by an inclined bar screen composed of 2 foot by ½-inch bars spaced 1 inch in the clear. The combined capacity of the 2 pumps will be about 576,000 gallons per day and should, therefore, be of adequate capacity to care for the sewage from this area for a considerable period in the future. It will, however, ultimately be necessary to increase the capacity of the pumping equipment at this pumping station unless the sewage from the high level portion of this district is intercepted and conveyed to the disposal plant by gravity inasmuch as the probable maximum future rate of flow tributary to this portion of the sewer district may exceed 1,500,000 gallons per day.

Pumping station no. 2

This pumping station is of similar design to pumping station No. 1, except that it is to be equipped with 2 4-inch centrifugal pumps having a capacity of 400 gallons per minute each or twice the capacity of the pumps at pumping station No. 1. The capacity of the pumping equipment of this pumping station will also have to be increased before the sewer district is fully developed unless the design be so modified as to provide for the conveyance of the sewage of a portion of the district to the settling tank by gravity flow.

Sewage disposal

It is proposed to treat the sewage from this sewer district in a sewage disposal plant consisting of an Imhoff tank, sprinkling filter and sludge drying bed to be located on the westerly side of Ellicott creek in the northeastern section of the district. The disposal plant to be constructed at first is designed to care for a population of 1,000 persons and the plans provide for a duplication of the proposed plant or for a total of 2,000 persons. Ellicott creek at this point has a drainage area of approximately 80 square miles. It discharges into Tonawanda creek, a few hundred feet above the point where Tonawanda creek empties into the Niagara river. Ellicott creek below this point is not used as a source of public water supply.

An inspection of the disposal plant site was made by a representative of this Department on June 13, 1917. This inspection showed that the disposal plant site appeared to be well selected. It was found that one house is located about 500 feet southerly from the plant but that there are no houses within ¼ of a mile in the direction of the prevailing wind which is southwesterly in this locality.

Settling tank

The proposed settling tank is of the two-story Imhoff type and is to be divided by means of concrete partitions into one upper settling compartment and two lower hopper shaped sludge compartments. It is to be 26 feet long and 14 feet wide and 25¾ feet deep inside dimensions with a maximum depth below the flow line of 23¼ feet. Provisions are made for the reversal of flow through the tank. The settling compartment has a capacity of about 17,500

gallons and will give a detention period of about 4 hours when serving a population of 1,000 assuming a per capita rate of sewage contribution of 100 gallons a day which is the basis of design used.

The sludge compartment has a capacity of about 2,000 cubic feet. The tank is provided with an 8-inch sludge pipe by means of which the sludge may be withdrawn and discharged to an adjacent sludge drying bed by gravity flow. The end of the sludge pipe is shown resting on the bottom of the tank. This does not appear to be a satisfactory arrangement and it would be better to support the pipe at a point about 8 inches above the bottom of the tank. The sludge valve is also so located that it would be liable to freeze unless properly protected.

It is proposed to facilitate the removal of the sludge by installing a 1-inch pressure line which extends to the bottom of the sludge hopper where it terminated in a perforated ring. It would be well also, and in fact more necessary, to add an additional perforated water pipe near the top of the sloping bottom of the sludge hopper where it joins the vertical wall of the tank. The pipe should also be increased to 1½-inch in diameter.

Sludge drying bed

The sludge drying bed is to be 25 feet long and 15 feet wide and is to be filled with filtering material consisting of a top layer of sand 10 inches thick overlying an 8-inch layer of gravel surrounding the underdrains. The effluent from the underdrains is to be discharged into the sprinkling filter. The total area of the bed is 375 square feet and should satisfactorily care for a population of 1,000 persons.

Dosing tank

The effluent from the settling tank is to be discharged through a 10-inch outlet pipe into a dosing tank located adjacent to the settling tank. This tank is to have a capacity of about 1,600 gallons and is to be equipped with a 10-inch automatic discharge siphon by means of which the sewage will be discharged intermittently into the distribution system of the sprinkling filter under a head of from 1¾ to 5 feet.

Sprinkling filter

The sprinkling filter which is to be constructed with concrete sides and a concrete floor, is to be 63 feet long by 36 feet wide giving a total area of .052 acres. It is to be filled to a depth of 5¾ feet with broken stone ranging from 1 inch to 1½ inches in size. The distributing system is to consist of 2 main distributors each controlled by a gate valve in order to permit of cutting off the flow of either or both lines, 3-inch lateral distributors and 3-inch cast-iron riser pipes equipped with Taylor square spray nozzles spaced 9 feet center to center. On the basis of design used the sprinkling filter will be required to operate at the rate of about 1,900,000 gallons per acre per day, equal to about 330,000 gallons per acre per day per foot of depth when serving a population of 1,000 persons. The underdrain system is to consist of a false floor of split hexagonal tiles which are to discharge into a main underdrain moulded in the concrete floor of the filter and extending longitudinally through it from one end to the other. The effluent pipe is to discharge into Ellicott creek near the plant. The average water level of the creek at this point is, according to the plans, 11½ and maximum high water mark 19½, which elevation is also the elevation of the bottom of the sprinkling filters so that the filter should not be back watered at times of high water.

Although I am of the opinion that it would be permissible at present to discharge sprinkling filter effluent into Ellicott creek at this time without further treatment, it will in all probability be necessary in the future to provide for a final settling tank to treat the sprinkling filter effluent and remove the solids which are given off from the sprinkling filters. Although the sludge deposited from sprinkling filter effluent is of a more stable character

than the sludge from raw sewage it would in all probability create objectionable conditions in the stream when the population served by the disposal plant is materially increased. It appears that the necessity of future installation of a final settling tank has been anticipated by the designing engineer inasmuch as the plans show that an area has been reserved for the construction of final settling tanks if necessary in the future.

Conclusions and recommendations

From our careful examination of plans it is found that although it would appear possible to so modify the plans as to materially reduce the amount of sewage pumped and consequently the cost of maintenance the proposed sewerage and sewage disposal system should satisfactorily care for the sewage of the sewer district and if properly constructed and if maintained with care and efficiency should produce an effluent that may safely be discharged into Ellicott creek at this time without objection. It is probable, however, that it will be necessary in the future when the district is more fully developed to provide for additional or more complete treatment of the sewage such as final sedimentation or sterilization or both before its discharge into Ellicott creek.

I would therefore, recommend that the plans be approved and a permit be issued allowing the discharge of effluent from the proposed sewage disposal plant into Ellicott creek on condition that whenever required by the State Commissioner of Health plans for additional or supplementary treatment of the sewage shall be submitted for approval.

Respectfully submitted,

THEODORE HORTON,

ALBANY, N. Y., *February* 13, 1917 *Chief Engineer*

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the town board of the town of Amherst to discharge effluent from the proposed sewage disposal plant to be constructed in connection with the sewer system for sewer district No. 1, into the waters of Ellicott creek, at the point of discharge shown by the plans within the town of Amherst in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That no storm or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
5. That whenever required by the State Commissioner of Health detailed plans satisfactory to this Department for additional or more complete treatment of the sewage such as final sedimentation or sterilization or both shall be submitted to this Department for approval; and the works shown by said plans shall be constructed and put in operation at such time or times thereafter as said commissioner may designate.

LINSLY R. WILLIAMS,

February 21, 1917 *Acting State Commissioner of Health*

AVON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for proposed sewer extensions in the village of Avon, Livingston county, submitted to this Department for approval by the Sewer Commissioners of the village on October 23, 1917.

The records of the Department show that original plans for a comprehensive sewer system for the village discharging into the Genesee river were approved by the then State Board of Health on December 14, 1894. These plans did not provide for any treatment of the sewage before its discharge into the Genesee river. Plans for extensions to this system were subsequently submitted and on March 4, 1912, plans for a sewage disposal plant consisting of a settling tank of the Imhoff type to be constructed at the first installation and a sprinkling filter for a more complete treatment of the sewage of the village to be constructed when required in the future, were approved. On May 22, 1912, amended plans for sewage disposal submitted in accordance with the requirements of the permit issued on March 4, 1912, were approved. The preliminary treatment works provided for by those plans were subsequently constructed and put in operation.

The plans now submitted provide for some 650 feet of 8-inch sewer in Oak street and in Temple street south of Oak street, tributary to the existing 6-inch sewer in Oak street, which latter sewer discharged into the village sewage disposal plant. According to the report of the Designing Engineer there are at present four houses on Temple street south of Oak street and it is not considered probable by him that Temple street will be extended beyond the limits of the proposed sewer owing to the location of the deep ravine south of this point.

The proposed sewer is to be constructed on a slope of .4 per cent and is to be provided with a flush tank at its upper end. Manholes are to be constructed at the intersection of Temple and Oak streets at the junction of the proposed sewer with existing sewer in Oak street and at a point midway between the upper and lower end of the sewer in Temple street.

As noted above the proposed 8-inch sewer is to discharge into the existing 6-inch sewer in Oak street. It is not desirable to have a larger sewer discharge into a smaller size sewer inasmuch as there is a tendency to clog at the junction point. In this case, however, there does not appear to be sufficient fall available for a 6-inch sewer in Temple street and it is probable that no serious difficulty from clogging will occur provided care is taken in constructing the channel in the bottom of the junction manholes.

From our careful examination of the plans it is found that the design of the proposed sewers is satisfactory in so far as sizes, capacities and facilities for cleaning and inspecting are concerned. I would, therefore, recommend that plans be approved and a permit be issued allowing the discharge of sewage from the proposed sewers into the Genesee river after such sewage shall first have been passed through the village sewage disposal plant.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y. *October* 30, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the sewer commissioners of the village of Avon to discharge sewage from

the proposed sewer extensions in Temple and Oak streets into the waters of the Genesee river through the outlet of the sewage disposal plant within the municipality of Avon in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That all sewage to be collected by the proposed sewers shall first be passed through the sewage disposal works of the village of Avon before its discharge into the Genesee river.

M. NICOLL, JR.,
Deputy State Commissioner of Health

October 31, 1917

BEDFORD HILLS (N. Y. State Reformatory for Women)

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on our examination of plans for additions and alterations to the sewage disposal plant at the New York State Reformatory for Women at Bedford Hills, submitted to this Department for appoval by the State Architect under section 14 of the Public Health Law, on March 8, 1917.

These plans provide for the construction of an underdrain on the northerly side of the northwesterly sand filter; for an underdrain on the southerly side of the southwesterly sand filter; for a manhole at the upper end of each of the main underdrains of the sand filter; and for a new sump manhole or sand catcher above the chlorination plant.

According to the plans and specifications the underdrains are to consist of 5-inch bell and spigot tile laid with open joints in trenches approximately 2 feet below grade. The underdrains are to be surrounded with broken stone or gravel and are to discharge into the manholes to be installed at the upper ends of the main drains of the sand filters.

The sump manhole or sand catcher which is to be located a few feet above the chlorination plant is to be divided into 2 compartments and an outlet channel and the pipes connecting with this structure are to be provided with valves so arranged as to permit of using either or both compartments at the same time. Each compartment is to be 3 feet 8 inches long, 2½ feet wide and 2 feet deep below the flow line.

From our examination of the plans I am of the opinion that if properly carried out they should satisfactorily meet the requirements for which they were designed and I would therefore recommend that the plans be approved.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 14, 1917

The plans were approved March 14, 1917.

BINGHAMTON

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on our examination of plans for proposed sewer extensions in the city of Binghamton, Broome county, submitted to this Department for approval by the city engineer on behalf of the Common Council on February 21, 1917.

The plans provide for a proposed sewer extension in Bradley street, between Fairview avenue and Glen avenue, and for proposed sewers in George street between Moeller street and Broad avenue, and between Ely street and the railroad.

The proposed sewer in Bradley street is to be 8 inches in diameter and is to be laid on a slope of .79 per cent. A manhole is to be placed at the upper end of the proposed sewer, at its intersection with the existing sewer in Fairview avenue, and at a point midway between Fairview avenue and Glen avenue. The proposed sewers in George street are also to be 8 inches in diameter and are to be laid on satisfactory slopes. Manholes are to be installed at all points of change of slope and alignment. The proposed sewers if properly constructed should satisfactorily meet the needs for which they were designed.

The sewage to be collected by all the sewers is to be discharged into the Chenango river through the existing Susquehanna street outlet sewer at the foot of Susquehanna street. The sewage from this outlet is finally to be intercepted and conveyed to the sewage disposal plant to be constructed by the city.

In view of the above I would recommend that the plans be approved and a permit issued allowing the temporary discharge of sanitary sewage from the proposed sewers into the Chenango river.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *February* 24, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Common Council of the city of Binghamton to discharge sewage from the proposed sewer extensions in Bradley street and George street into the waters of Chenango river at the foot of Susquehanna street, within the municipality of Binghamton, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That no storm or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That this permit shall expire on October 1, 1917, unless this time shall be extended by the State Commissioner of Health.

LINSLY R. WILLIAMS,
Acting State Commissioner of Health

March 2, 1917

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for proposed sewer extension in the city of Binghamton, Broome county, submitted to this Department for approval by the city engineer on behalf of the Common Council on May 3, 1917.

The plans provide for an 8-inch sewer in Louisa street extending from Robinson street to a point near George street, a distance of approximately 600 feet. It is to be constructed with a slope of .817 per cent and is to be tributary to the existing sewer in Robinson street which empties into the Chenango river through the Susquehanna street outlet. The sewage from this outlet is to be intercepted by the intercepting sewer of the city now under construction.

From our examination of the plans it is found that the proposed sewer if properly constructed should satisfactorily meet the needs for which it was designed and I would, therefore, recommend that the plans be approved and a permit be issued allowing the temporary discharge of sewage from the proposed sewer into the Chenango river at the foot of Susquehanna street.

Respectfully submitted,

THEODORE HORTON,

ALBANY, N. Y., *May* 7, 1917 *Chief Engineer*

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Common Council of the city of Binghamton to discharge sewage from the proposed sewer in Louisa street into the waters of Chenango river at Susquehanna street, within the municipality of Binghamton, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That this permit shall expire on October 1, 1917, unless this time shall be extended by the State Commissioner of Health.

M. NICOLL, JR.,

Acting Deputy State Commissioner of Health

May 9, 1917

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for a proposed system of sewers in the westerly section of the city of Binghamton, Broome county, submitted to this Department for approval by the city engineer on behalf of the Common Council on April 5, 1917.

The plans provide for a proposed system of sewers in what is known as the Riverside Drive section south of Harrison street in the western part of the city and show sewers in Riverside Drive, LeRoy street, Highland avenue, West End avenue, Crary avenue, Giles street, Matthew street, Wheeler avenue and Helen street. A portion of these sewers are to discharge into the Fourth ward outfall sewer at LeRoy street. The other portions of the system are to discharge into the Susquehanna river through two new outlets, one of which

is to be 24 inches in diameter and the other 18 inches in diameter. These outlets are to discharge into the river at points 850 and 1,750 feet respectively, west of the Fourth ward outfall sewer. The proposed sewers, excepting the outlet sewers, are to vary in size from 8 to 10 inches in diameter and are to be constructed with slopes sufficiently steep to provide self-cleansing velocities in them under ordinary conditions. Manholes are to be constructed at all points of change of slope and alignment and at intermediate points not more than 400 feet apart.

According to the plans and data submitted by the city engineer, the two new outlets into the river are either to be intercepted by section 2 of the proposed intercepting sewer west of the Fourth ward outfall sewer, in accordance with plans approved by this Department on March 8, 1911, or if the sewage disposal plant to be constructed by the city is located near or opposite the Fourth ward outfall sewer, the proposed new outlet sewers will be intercepted by a small intercepting sewer and carried back to the disposal plant. These outlets appear to be at a sufficiently high elevation to permit of carrying the sewage back to the Fourth ward outfall sewer if necessary.

From our careful examination of the plans it is found that the design of the proposed sewers is satisfactory with respect to slope, alignments, facilities for cleaning, inspecting and flushing and other features of a hydraulic and sanitary nature, and I would, therefore, recommend that the plans be approved and a permit be issued allowing the temporary discharge of sewage from the proposed sewers into the Susquehanna river at the points of discharge shown by the plans. I would further recommend that the permit contain in addition to the usual revocation and modification clauses, the condition that the sewage from the proposed new outlets be intercepted and conveyed to the sewage disposal works when such disposal works are constructed by the city.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 7, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Common Council of the city of Binghamton to discharge sewage from the proposed sewers in Riverview avenue and English street into the waters of Chenango river at the foot of Ferry street, within the municipality of Binghamton, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That this permit shall expire on October 1, 1917, unless this time shall be extended by the State Commissioner of Health.

M. NICOLL, JR.,
Acting Deputy State Commissioner of Health

May 9, 1917

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for a proposed sewer extension in the city of Binghamton, Broome county, submitted to this Department for approval by the city engineer on behalf of the common council of the city.

The plans provide for an 8-inch sewer in Baxter street extending from the existing sewer in this street at the intersection of Cliff avenue to Holland street, a distance of nearly 550 feet. It is to be constructed on a slope of from 1 to 2 per cent and a manhole is to be installed at the upper end of the sewer and at each point of change of slope. The maximum spacing between two adjacent manholes is to be less than 300 feet.

The proposed sewer is tributary to the so-called Downsville sewer system in Binghamton which discharges into the Susquehanna river through the sewer system of Johnson City, formerly the village of Lestershire. The plans for the sewer system in the Downsville sewer district were approved by this Department on January 17, 1912, on the following conditions:

> "That after September 1, 1914, the sewage to be collected by the proposed sewers shall, by joint arrangement between the city of Binghamton and the village of Lestershire, be passed through the sewage disposal works of the village of Lestershire, to be constructed as required by and in accordance with plans approved by this Department."

Since the above mentioned plans were approved the question of so locating the proposed sewage disposal works of the city of Binghamton as to permit of intercepting the sewage of Johnson city and disposing of it in the city sewage disposal works has been under consideration but has not been definitely settled.

In view of the above and after careful consideration of the essential features of the design of the proposed sewer, I would recommend that the plans for the proposed sewer in Baxter street be approved, and a permit issued allowing the discharge of sewage from this sewer into the Susquehanna river through the outlet sewer of the village of Johnson City.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 17, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the common council of the city of Binghamton to discharge sewage from the proposed sewer extension in Baxter street into the waters of Susquehanna river through the outlet sewer of the village of Johnson City, within the municipality of Johnson City, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That whenever required by the State Commissioner of Health

arrangements shall be made and carried out for properly treating the sewage to be collected by the proposed sewer either separately or through joint arrangement with the village of Johnson City.

M. NICOLL, JR.,
Deputy State Commissioner of Health

December 20, 1917

BRIGHTON (Friendly Home)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of revised plans for sewage disposal for the Friendly Home in the town of Brighton, Monroe county, submitted to this Department for approval on September 6, 1917.

The original plans for sewage disposal for this institution were approved on August 22, 1917. These plans provided for a sewage disposal plant consisting of an Imhoff tank, dosing tank and 3 intermittent sand filters. The plant was designed to care for a population of 130 which is the capacity of the institution. It was found that the sand filters were designed to operate at the rate of 100,000 gallons per acre per day based upon a daily per capita contribution of sewage of 60 gallons, or a rate of about 160,000 gallons per acre per day based upon a per capita rate of sewage contribution of 100 gallons per day. This rate would have been excessive and the plans were therefore approved on condition that the area of the sand filters be increased to 1⅔ times the area shown on the plans so that the contribution of the sewage to the sand filters would not exceed a rate of flow greater than that contributed by 1,000 persons for each acre or fraction thereof in proportion. This would be equal to a rate of filtration of 100,000 gallons per acre per day based on a daily per capita rate of flow of sewage of 100 gallons which rate should not be exceeded.

The plans now submitted show that the sand filters have been enlarged in accordance with the above requirements and the sand filters provided for by the present revised plans have a combined area equal to .13 acre.

In view of the above I would recommend that the plans be approved. It should not be necessary, however, to issue a permit in connection with the approval of these plans inasmuch as the permit issued in connection with the approval of the original plans contained the condition "That the sewage disposal works shown by the plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof."

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 7, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of Friendly Home, town of Brighton, to discharge effluent from the proposed sewage disposal plant to be constructed at Friendly Home into the waters of Allen creek at the point of discharge shown by the plans within the town of Brighton in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof except as provided in condition 6 of this permit.

4. That only sanitary or domestic sewage, and no storm water or surface water from streets, grounds, roofs or other areas shall be admitted to the proposed sewers and sewage disposal works.

5. That no sewage sludge from any part of the disposal works shall be discharged into Allen creek or any other watercourse or body of water.

6. That the area of the sand filters shall be increased to 1⅔ times the area shown by the plans so that the contribution of sewage to the sand filters shall not exceed a rate of flow greater than that contributed by 1,000 persons for each acre, or fraction thereof, in proportion.

M. NICOLL, JR.,
Deputy State Commissioner of Health

August 22, 1917

BRONXVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of the plans for a proposed sewer extension to be built in Oriole avenue in the village of Bronxville, Westchester county, submitted to this Department for approval by the village engineer on behalf of the trustees of the village on November 9, 1917.

The plans submitted contemplate the construction of about 800 feet of 8-inch tile sewer to be laid in Oriole avenue south of Woodland avenue. The new sewer will connect with the general sewerage system of the village, plans for which were approved by this Department on May 14, 1902, and the sewage from the line will be discharged through the Bronx valley sewer into the waters of the Hudson river.

The grade of the proposed sewer is to be 0.33 per cent, a slope a little flatter than is generally desirable for a sewer of this size; but since a flush tank is provided at the upper end, the sewer, if properly laid, should operate satisfactorily. A manhole is provided at each change in grade and horizontal alignment. The maximum distance between the manholes is 350 feet. Ample facilities will, therefore, be provided for inspecting and cleaning the sewer.

From our examination of these plans it would appear that the proposed extension, if properly constructed, should satisfactorily care for the sewage from the section to be served by it, and I would, therefore, recommend that the plans be approved.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *November* 16, 1917

The plans were approved November 17, 1917.

BROOME COUNTY TUBERCULOSIS HOSPITAL

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon our examination of plans for water supply and sewage disposal for the proposed Broome County Tuberculosis Hospital in the town of Chenango, submitted to this Department for approval on November 19, 1917.

The site consists of an area of about 34 acres, located on a hill about ½ mile northeast of the Chenango Bridge station of the D. L. & W. R. R., and about 5 miles northeast of Binghamton. The elevation of the ground at the site ranges from about 1,100 feet to 1,350 feet above sea level. The Chenango river flows in the valley to the south of and about ¾ of a mile from the site. The top soil on the property consists of a disintegrated shale, clay and gravel to a depth of 4 or 5 feet. Underneath this top soil is a substratum of a shaly limestone which outcrops at a number of points.

The buildings on the site are to consist of an administration building, a women's pavilion and a men's pavilion located on an elevation of about 1,160 feet above sea level and a pumping station and garage located north of and a few feet higher than the main buildings. According to the report of the architect who prepared the plans, an immediate present population of 80 and a future population of 100 is to be provided for. Plans for water supply and sewage disposal for this institution were first submitted for approval on November 13, 1917, but the plans were not in satisfactory condition for approval and they were therefore returned to the architect for modification on the same date.

Water supply

The plans show that the water supply for the institution is to be obtained from a driven well located in the northwest corner of the pump house from which the water is to be pumped through a 3-inch wrought iron force main to a 15,000 gallon reservoir located about 500 feet north and at an elevation of about 140 feet above the main group of buildings. The distribution system is to consist of 3-inch wrought iron pipe. Four fire hydrants are also to be provided.

Details of the construction of the well and pumping equipment are not shown but according to the report of the architect the well is driven through 11 feet of clayey loam or hard-pan and then through rock for the remainder of its depth. It is stated that the water stands at 70 feet below the surface of the ground and the pumping equipment is to be so arranged as to permit of pumping the well down to a depth of 90 feet below the top of the ground. There are no buildings on the watershed above the well. The pumping equipment is to consist of a 9 horse-power gasoline engine by means of which the water is to be pumped to the reservoir through the 3-inch discharge pipe.

The reservoir is to be located near the top of the hill above the institution at such an elevation that the high water mark of the reservoir will be about 140 feet above the ground level of the building site. It is to be constructed of reinforced concrete and is to be located entirely below ground. A manhole opening is to be provided at the top. It is to be hopper shaped, 20 feet square at the top and 13 feet 6 inches deep below the high water mark. The proposed reservoir will have a capacity when full of about 15,000 gallons and will, therefore, provide for a storage period of about 1½ days for a maximum population of 100 assuming a per capita rate of water consumption of 100 gallons per day.

A 3-inch overflow and blow-off extending from the lowest point of the reservoir is to be provided. It is also planned to provide a ½-inch tell tale pipe extending from the high water mark to the pump house. This will enable the operator to determine when the reservoir is full, but will, of course, not indicate the level of the water in the reservoir below that point. This, however, could be done by installing an electrical signaling device operated by a float in the reservoir.

As noted above the distribution system for the water supply as shown on the plans consists of a 3-inch galvanized iron pipe about 600 feet long extending from the reservoir to the administration building, the center one of the three main buildings; and two branch lines of the same diameter extending from this point in each direction passing under the pavilions to points about 15 feet beyond them. Four fire hydrants are provided, all connected to these branch lines. Two of the hydrants are located between the administration building and the pavilions, one on each side of the administration

building. Each of the other two hydrants are located about 15 feet beyond each pavilion. In order to save expense it is proposed at present to provide only 2-inch pipe from the hydrants between the administration building and the pavilions to the hydrants beyond the pavilions.

The system is a satisfactory one so far as providing water for domestic purposes is concerned but it could apparently be improved when considered in connection with the fire protection of the buildings. The size of the main and the laterals is such that it will be possible to use one ¾-inch or two ⅝-inch streams in case of fire. Such provision is not usually considered effective in controlling a fire in a large frame building, and cannot be considered as satisfactory in the present case for either controlling a fire in one of the buildings or preventing its spread from one to another. Furthermore, the location of the hydrants between the buildings and at points only 15 feet beyond the buildings will make it impossible to reach the hydrants in case of fire unless the wind is blowing from such a direction as to drive the flames and smoke away from them. It would seem advisable, therefore, to make the main supply line of 4-inch pipe, preferably of cast iron, and to distribute the water to the hydrants by means of a loop, rectangular in form, of 3-inch pipe around the administration building. The hydrants could be located near the corners of the rectangle, and should be 50 or 75 feet distant from the buildings. Service pipes of galvanized iron, 2 inches in diameter or of other suitable size could be laid from the loop into the buildings for supplying water for domestic purposes. This arrangement would make it possible to obtain one good 1-inch stream of two ¾-inch streams which would be much more effective than streams mentioned above. The arrangement of the pipe in the form of a loop would permit the water to reach the hydrants from either direction, and prevent the opening of a second hydrant from interfering with the flow from the first.

The use of larger streams would, of course, increase the draught on the reservoir, and it would be desirable, therefore, if the size of the pipes was increased, to make the capacity of the reservoir about 25,000 gallons instead of 15,000 gallons in order that the quantity of water available will be sufficient for the maintenance of the fire streams for a period necessary for the proper protection of the institution. From the examination of the plans it would appear that by redesigning the reservoir and making it rectangular in form the additional capacity could be provided without any material increase in the cost of the structure.

Sewage disposal

It is proposed to dispose of the sewage in a sewage disposal plant consisting of a settling tank and an auxiliary sludge drying bed located about 60 feet southwest of the women's pavilion. The effluent is to be discharged into the Chenango river. The sewage from the buildings is to be conveyed to the settling tank by means of 6-inch sewers. The sewer between the men's pavilion and the manholes opposite the women's pavilion is shown with a slope of only about 0.3 per cent. It would be better to increase this slope to not less than 1 per cent in order to give better assurance that there will be self-cleansing velocities of the sewer. This could be done without increasing the cost of construction and there is ample fall available to permit of increasing the slope of the sewer.

The settling tank is to be a covered single compartment tank located about 60 feet southwest of the women's pavilion. It is to be a covered concrete structure, 20 feet long by 8 feet wide inside dimensions with a depth below the flow line of from 3½ to 6½ feet. It will have a capacity when clean of about 5,400 gallons and will, therefore, provide for a detention period of the sewage of from 12 to 16 hours on the basis of the design used.

Provisions are to be made for drawing off the sludge from the tank and discharging it to a sludge bed by gravity flow. This bed is to be divided into two units 10 feet square each, giving a total area of 200 square feet which should be adequate for the needs of the institution. The sludge beds are to be placed in excavation and are to be filled to a depth of 12 inches with filtering material

consisting of a lower layer of broken stone 9 inches deep and a top layer of sand 4 inches deep. The beds are to be provided with 4 lines of underdrains spaced about 2½ feet on centers and a main 4 inch drain which will empty into the manhole on the effluent pipe from the settling tank.

The plans do not show the location nor alignment of the effluent pipe from the settling tank beyond the limits of the hospital property. The report of the architect states, however, that details of this sewer are to be submitted as soon as the necessary surveys for the installation of this line are completed. The sewer should not be less than 6 inches in diameter and should be constructed with a slope of not less than 0.65 per cent. It would appear from the topographical maps submitted with the plans that there is ample fall to obtain the required slope for the pipe. The outlet end of the pipe should be so located that it will be submerged at low water stage of the river.

In conclusion I would state that as a result of our examination of these plans and after careful consideration of general and local conditions and requirements, we find that the plans as submitted are not in satisfactory condition for approval by this Department. I would, therefore, recommend that they be returned to the architect for modification and amendment according to the suggestions contained herein.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *November* 24, 1917

The plans were revised in accordance with the recommendations of the report, and the revised plans approved November 27, 1917.

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Supervisors of Broome county to discharge effluent from the sewage disposal plant to be constructed at the Broome County Tuberculosis Hospital in the town of Chenango into the waters of Chenango river near Chenango bridge within the town of Chenango in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage and no storm water from roofs or other areas shall be admitted to the proposed sewage disposal plant.
4. That satisfactory detailed plans showing the outlet sewer from the disposal plant to the Chenango river shall be submitted to this Department for approval before the disposal plant is constructed.
5. That whenever required by the State Commissioner of Health satisfactory detailed plans for additional works for more complete treatment of the sewage of the Broome County Tuberculosis Hospital shall be submitted for approval; and after approval of said plans any or all portions of such additional or supplementary works for more complete treatment of the sewage shall be constructed and put in operation at such time or times thereafter as said Commissioner may designate.

M. NICOLL, JR.,
Deputy State Commissioner of Health

November 28, 1917

BUFFALO (Bird Island Outfall)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for a proposed extension of the so-called Bird Island pier outfall sewer in the city of Buffalo, submitted to this Department for approval by the city engineer on April 2, 1917.

It is assumed at the outset that the approval of these plans is requested merely as a temporary measure to enable the construction of water front improvements to proceed at once. In fact it is impracticable to consider this proposition in any other light inasmuch as the problem of interception and disposal of the sewage of the city has not been worked out definitely but as we are informed is the subject of thorough investigation by a commissioner of sanitary engineers appointed for that purpose.

The Bird Island sewer, according to data submitted by the city engineer, is a trunk and intercepting sewer which serves the business section and the easterly central portion of the city and discharges into the Niagara river at the present water's edge, between Albany and Ferry streets, after passing under the Black Rock shipping canal by means of an inverted siphon. It appears that the city is to construct a new pier wall on the bulkhead line of the river about 50 feet beyond the present outlet, and that it is proposed to extend the present outlet to the bulkhead line. The plans also provide for extending a branch from the outlet on the inside of the bulkhead or pier line along the river toward Squaw island for a distance of about 600 feet, which is as far as it is proposed to carry the river improvements at present.

The present outlet section of the Bird Island sewer is 8½ feet in diameter and the invert of the outlet is about 18 feet below the level of the river. The proposed extension of the outlet to the bulkhead line is also to be 8½ feet in diameter and is to consist of a steel pipe encased in concrete. A stop plank gate is to be provided near the outlet end of the proposed steel pipe extension.

It would appear that the proposed extension of the outlet to the bulkhead line, a distance approximately 50 feet, should not alter appreciably the hydraulic conditions of the Bird Island sewer, and that the construction of the proposed extension should not materially affect any plans that may be drawn up for the interception and treatment of the sewage tributary to this sewer.

The branch interceptor of the Bird Island sewer to be constructed along the new pier inside of the bulkhead line is also to be 8½ feet in diameter. The upper 60 feet section of this sewer extending from a "Y" branch some 25 feet from the proposed outlet to a gate manhole is also to be a steel pipe laid in concrete. The remainder of this branch extension is to be constructed either of reinforced concrete pipe or of wood stave pipe and is to terminate at a manhole about 540 feet below the proposed gate manhole.

It appears from the report submitted by the city engineer in connection with the plans that the proposed branch extension is to extend in the direction of one of the proposed sewage disposal plants to be constructed either on the pier below the proposed outlet or on Squaw island, the site recommened by the International Joint Commission for sewage disposal, and that it is proposed to continue the extension simultaneously with the river front improvement.

The slope on which the proposed branch extension is to be laid is not shown by the plans nor have any data been submitted as to the present and probable future flow of sewage tributary to the Bird island outlet, so that it is impracticable to determine the capacity and adequacy of this extension. Furthermore, in the absence of any definite statement or plans for the interception and disposal of the sewage of the city we have no means of judging if the proposed branch extension will fit into a comprehensive scheme for such interception and disposal of the sewage of the city. It is impossible, therefore, to finally pass upon this feature of the present plans

and it would seem that approval of the plans could consistently be given at this time only on condition that this sewer be modified, supplemented or relieved if necessary, in the future to make it conform suitably with the comprehensive plans for the interception and treatment of the sewage of the city when these have been definitely developed.

In view of the above I would recommend that the plans be approved and a permit be issued allowing the discharge of the sewage from the proposed outlet into the Niagara river on the following conditions:

1. That within two years complete plans for the interception and treatment of the entire sewage of the city of Buffalo shall be submitted to this Department for approval.
2. That no sewage shall be discharged into the proposed branch extension until complete plans for the interception and treatment of the entire sewage of the city of Buffalo have been submitted to and approved by this Department as provided by condition 1.
3. That the proposed branch extension be modified, supplemented or relieved, if necessary, in such manner as will properly conform with said complete plans for the interception and treatment of the entire sewage of the city, to be submitted and approved as provided in condition 1.
4. That upon the completion of the works for the interception and treatment of the sewage of the city, the sewage then discharging through the proposed outlet shall be diverted into the new system of intercepting sewers and sewage treatment works, and said outlet shall be abandoned or otherwise modified or rearranged in such manner as may be required or approved by the State Department of Health.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *April* 25, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Council of the city of Buffalo to discharge sewage from the proposed extension of the Bird Island pier outfall sewer into the waters of Niagara river at the point of discharge chosen by the plans, within the municipality of Buffalo, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That on or before May 1, 1919, satisfactory complete plans for the interception and treatment of the entire sewage of the city of Buffalo shall be submitted to this Department for approval.
4. That no sewage shall be discharged into the proposed branch extension until complete plans for the interception and treatment of the entire sewage of the city have been submitted to and approved by this Department as provided by condition 3.
5. That the proposed branch extension shall be modified, supplemented or relieved, if necessary, in such manner as will properly conform with said complete plans for the interception and treatment of the entire sewage of the city, to be submitted and approved as provided in condition 3.

6. That upon the completion of the works for the interception and treatment of the sewage of the city, the sewage then discharging through the proposed outlet shall be diverted into the new system of intercepting sewers and sewage treatment works, and said outlet shall be abandoned or otherwise modified or rearranged in such manner as may be required or approved by the State Department of Health.

M. NICOLL, JR.,
Acting Deputy State Commissioner of Health

April 30, 1917

CHAPPAQUA (Victor Guinzburg)

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewage disposal for the property of Mr. Victor Guinzburg, located in the town of New Castle, Westchester county, about 2 miles southeast of Chappaqua, submitted to this Department for approval on February 1, 1917.

According to the plans the property of Mr. Guinzburg is located on the watershed of the Kensico reservoir. Although the report of the designing engineers submitted with the plans stated that "below the disposal field the ground has a moderate and uniform slope and the nearest course is a small brook about 1,000 feet distant," the watercourse and ditches tributary to the brook were not shown by the plans and the designing engineers were accordingly asked to submit data as to the distance of the proposed disposal plant from the nearest perceptible line of drainage. Additional sketch plans showing the required data were received on February 28, 1917.

According to the report of the designing engineers the maximum population to be cared for is 8, with an average of 6. It is proposed to treat the sewage from this property in a sewage disposal plant consisting of a settling tank, dosing tank, gate chamber and subsurface irrigation system. The plant is located from 150 to 200 feet from the residence. The nearest stream tributary to the Kensico reservoir is a small brook from 500 to 800 feet from the disposal plant. It is stated by the report of the engineers that there is no ledge rock near the surface of the area selected for the disposal field and that the ground does not contain subsurface water at this point for a depth of at least 5 feet and that the surface of the ground does not show any indications of saturation or marshy conditions. The subsoil is said to be loam, slightly clayey in character with a porous top soil 6 to 8 inches thick.

Settling tank

The settling tank which is to be covered with a brick dome provided with a manhole, is to be circular in plan, 7 feet in diameter and 3½ feet deep below the flow line. It is to be provided with a submerged inlet and outlet, and a central baffle wall having two side openings 9 inches wide each and from 2 feet to 3 feet 3 inches long. The settling tank has a capacity as designed of about 1,000 gallons and will, therefore, provide for a detention of the sewage of from 1¼ to 1⅔ days, assuming a per capita rate of sewage contribution of 100 gallons per day. The tank is therefore of adequate capacity to care for the probable flow of sanitary sewage from this property. It should, however, be increased in depth to not less than 5 feet in order to allow greater depth for the storage of sludge. Inasmuch as the settling capacity is ample the diameter of the tank should be so decreased as to not increase the capacity of the tank when the depth is increased.

No provisions have apparently been made for the disposal of sludge from the settling tank. The sludge should be removed from the tank at least once a year and preferably two or three times a year. Rather than to attempt to dispose of it on a sludge drying bed, as is done in the case of larger plants, it would be better to bail or pump it into watertight containers in which it may be hauled away and disposed of by burial at some suitable point not less than 250 feet from any stream or perceptible line of drainage.

Dosing tank

The dosing tank, which is also to be covered and provided with a manhole opening, is to be located adjacent to the settling tank. It is to be 5 feet 6 inches in diameter and 1 foot deep below the flow line and will have a capacity of about 180 gallons. The outlet of the dosing tank is to be connected with a discharge siphon to be placed in a small adjacent brick chamber from which the effluent is to be discharged through a 4-inch vitrified tile pipe to a gate chamber at the disposal plant. This chamber is to be so arranged as to permit of discharging the sewage into either of the 2 sections of the disposal field, thereby providing for periods of rest.

Subsurface irragation system

This system is to be divided into two sections and is to comprise 8 lines, 100 feet long each, of 8-inch tile of the horseshoe pattern. The tile are to be laid on nearly flat slopes at a depth of 18 inches below the surface and are to be placed on and surrounded with broken stone or gravel.

The disposal field covers an area of nearly 1/10 acre and will, therefore, be required to operate at from 6,000 to 8,000 gallons per acre per day, which is a very moderate rate of operation. The system also provides for from 100 to 133 feet of distributing tile per person served which is also a liberal allowance for a disposal system of this kind.

Conclusions and recommendations

From our careful examination of the plans it would appear that they meet the requirements of the rules and regulations for the protection from contamination of the water supply of New York city and that the proposed sewage disposal plant, if properly constructed and if maintained with care and efficiency should satisfactorily care for the sewage from the property. I would, therefore, recommend that the plans be approved on the following conditions:

1. That the depth of the settling tank below the flow line be increased to not less than 5 feet and that the diameter of the tank be so decreased as to give practically the same settling capacity as provided for by the plans.
2. That the sludge from the settling tank shall be properly buried at a distance of not less than 250 feet from the nearest stream or watercourse or perceptible line of drainage.

Inasmuch as the proposed disposal plant is to be situated on one of the watersheds of Kensico reservoir of the water supply of New York city, the Department of Water Supply, Gas and Electricity of New York city was notified on March 10, 1917, that plans for sewage disposal for this property had been submitted to this Department for approval and that our approval of the plans would be held in abeyance pending action by New York city in the matter. The designing engineers were also advised on the same date of the necessity of receiving the approval of these plans by the New York city Department of Water Supply, Gas and Electricity, as required by section 14 of the Rules and Regulations for the protection of the New York city water supply from contamination, enacted by the State Department of Health on February 1, 1917. Under date of March 26, 1917, we were advised by the city authorities that the plans for sewage disposal for the property of Mr. Victor Guinzburg near Chappaqua had been approved subject to their right of inspection during construction and operation.

Respectfully submitted,
THEODORE HORTON,

ALBANY, N. Y., *March* 28, 1917

The plans were approved March 28, 1917.

CHEMUNG COUNTY TUBERCULOSIS HOSPITAL

Hermann M. Biggs, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewage disposal for the Chemung County Tuberculosis Hospital submitted to this Department for approval on July 8, 1917.

The plans for sewage disposal for this hospital by means of sedimentation and subsurface irrigation were first submitted for approval on June 14, 1917, but it was found from our preliminary examination of them that they were not in satisfactory condition for approval nor did they contain sufficient data to permit of finally passing upon them. They were therefore returned on June 15 to the architects for the hospital with the recommendations that they be modified in a number of respects and that certain additional data be supplied as outlined in our letter under date of June 15. 1917.

The plans were revised in general accordance with our requirements and were resubmitted for approval on July 8. It appeared however from the data submitted with the plans that the soil at the site for the disposal plant which was said to consist of a "medium clay loam underlaid with clay and slightly mixed with gravel and loose shale" was not suitable or at least not well adapted to the proposed method of disposal by subsurface irrigation and the architects were accordingly requested to submit samples of the soil from the site of the proposed subsurface irrigation system collected 1, 2, 3, 4 and 5 feet respectively below the surface of the ground. These samples were received on July 28 and show that the soil at the site is composed almost entirely of a heavy clay and disintegrated shale with very little if any sand or loam.

The proposed hospital site which comprises an area of about 12 acres is located on the side of a high hill about ⅜ mile west of the city of Elmira and about one mile north of the Chenango river. According to the report of the architects who prepared the plans of the hospital it appears that this institution will accommodate 22 patients and about 6 attendants at first and that the future population will probably never exceed 50 persons. The water supply is derived from a drilled well 268 feet deep located on high ground north of and some 125 feet from the hospital. The well is driven through 6 feet of surface soil, 36 feet of hard pan and boulders and the balance in flint and hard lime and sandstone, according to the report of the architects.

The plans for sewage disposal for the institution provide for a settling tank, dosing chamber and subsurface irrigation system and sludge drying bed for the disposal of sludge. The settling tank is 16 feet deep by 5 feet wide inside dimensions and 5 feet deep below the flow line. It will have a settling capacity of about 3,000 gallons and will therefore provide for about one day's detention of the sewage for the population provided for at first assuming a daily per capita flow at an average of 100 gallons.

The sludge from the settling tank is to be discharged by gravity flow to a sludge drying bed 20 feet square located about 250 feet east of the settling tank. The sludge pipe is to consist of 5-inch salt glazed pipe laid on a slope of about 5 per cent and having a hydraulic gradient of about 8 per cent. The report of the architects states that the sludge bed is to be located in the woods and that the sludge will be carried away.

I am of the opinion that the sludge pipe should be not less than 6 inches and preferably not less than 8 inches in size in order to prevent the clogging of this pipe. The sludge bed should also be filled to a depth of not less than 12 inches with sand which will act as a filtering material and facilitate the drying of the sludge.

The dosing tank which will have a capacity of about 700 gallons is to be located adjacent to the outlet end of the settling tank and is to be provided with an automatic discharge siphon by means of which the settled effluent is to be discharged intermittently into the distribution system of the subsurface irrigation field. The subsurface irrigation system is to be located below the hospital and driveway leading to the institution at a distance of about 250 feet from the hospital building. It is divided into 2 beds of 3 sections each so arranged that either bed or any section may be thrown out of use for resting

if necessary. Provisions are also made by the plans for the installation in the future of an additional subsurface irrigation field on the westerly side of the proposed fields shown in detail.

The two beds of the subsurface system to be constructed first will contain according to the plans 2,750 feet of distributing tiling equal to about 100 feet of tiling per person served for the institution as first constructed. Each section of the subsurface irrigation system is to contain 450 feet of 4 inch subsurface tiling laid with a slope of 1 inch in 50 feet. The lines of tiling according to the report of the architects are to be spaced 3½ feet apart. They are to be laid in trenches filled with broken stone or coarse cinders and all joints of tiles are to be protected with tar paper.

The samples of soil from the disposal plant site show that it consists almost entirely of clay and shale with very little if any sand or loam and there can be no assurance that the subsurface irrigation system installed in soil of this kind will continue to operate successfully owing to the almost impervious nature of this soil as indicated by the samples submitted by the architects. As pointed out to the medical director of the Elmira Tuberculosis Hospital there are limitations to the applicability of subsurface irrigation plants for sewage disposal. Soils similar to that found at this site have been found to be absolutely unsuitable for this method of disposal and it would seem wise for the hospital to abandon the proposed scheme and to adopt some other method of disposal.

It appears, however, from a communication from the medical director referred to that he has had considerable experience in the disposal of sewage in soil such as that found at this site and that he is convinced that the proposed plant is more than ample for the purpose intended. I can see no objection therefore to permitting the institution to try to dispose of the sewage as provided for by the plans with the understanding that if the system should be found not to operate satisfactorily some other method of disposal of the sewage from the hospital be adopted. There are a number of ways in which the sewage could be satisfactorily disposed of with very little if any greater cost such as by extending the influent pipe from the proposed settling tank to and discharging the effluent from the tank into the Chemung river below the intake of the Elmira water supply or by extending the sewer from the hospital to and discharging the sewage into the city sewer system if arrangements could be made with the city for so doing.

In view of the above I would recommend that the plans be approved only on condition that the proposed subsurface irrigation system be extended when necessary in the future or that some other suitable method of disposal of the sewage of the hospital be provided should the proposed method of disposal be found to be inadequate.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *August* 1, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Chemung County Tuberculosis Hospital to discharge effluent from the proposed sewage disposal plant into the ground waters tributary to the Chemung river within the town of Elmira in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such recovation, modification or change shall become necessary.

way action by this Department on any future application that may be

2. That the issuance of this permit shall not be deemed to affect in any

made for permission to discharge additional sewage or effluent into the waters of this State.

3. That the sewage disposal works shown by the plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewage disposal works.

5. That no sewage sludge from any part of the sewage disposal works shall be discharged into the Chemung river or any other watercourse.

6. That when the population contributing sewage to the proposed sewage disposal works shall exceed 28 people the subsurface irrigation system shall be proportionately enlarged or extended in accordance with the approved plans.

7. That whenever required by the State Commissioner of Health satisfactory detailed plans for some other suitable method of disposal of the sewage of the Chemung County Tuberculosis Hospital shall be submitted to this Department for approval and that after the approval of said plans any or all portions of such means for sewage disposal shall be constructed and put in operation.

M. NICOLL, JR.,
Deputy State Commissioner of Health

July 31, 1917

CLIFTON (Benson Mines Co.)

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on our examination of plans for the disposal of sewage from the proposed toilet room at the Benson Mines Company, Benson Mines, St. Lawrence county, submitted to this Department for approval on March 1, 1917.

These plans were first submitted for approval on February 15 and after a preliminary examination of them by the Engineering Division which showed that they did not contain sufficient data to permit of finally passing upon them, the plans were returned to the engineer for the company with the request that they be modified in certain respects and that additional data with respect to the basis of design, location, etc., be submitted. Our examination of the present plans show that they have been modified in general accordance with our suggestions.

The Benson Mines Company is located in the southern part of the town of Clifton near the junction of the N. Y. C. & H. R. R. R. and the Cranberry Lake R. R. The Little River, a tributary of the east branch of the Oswegatchie river, flows through the property of the mining company.

According to the plans and data submitted by the mining company the property comprises in addition to the plant at the mines, some 17 buildings occupied by the employees. The various buildings at the mines and those occupied by the employees are provided with a water supply. A hotel on the mine property near the railroad station and the buildings occupied by the employees together with a school and a store are provided with sewerage facilities. The sewage from the hotel is at the present discharged into the river at a point about 200 feet below the bridge crossing the river and the sewage from the company's houses occupied by the employees referred to discharges into the river on the opposite side of the stream about 100 feet below the bridge.

The plans now presented provide for the disposal of sewage from a new toilet room to be used by the employees at the mines. This toilet room is to contain 4 wash basins, 4 water closets and 2 trough urinals. The toilet room is to be used by from 18 to 80 men with an average of about 60. The sewage contribution is estimated at about 38 gallons per capita or a total flow of approximately 2,000 gallons per day.

It is proposed to treat the sewage from this toilet room in a septic tank to be located adjacent to the toilet room and to discharge the effluent through a short length of 6-inch pipe into an open ditch which discharges into the river below the outlet of the hotel sewer some 1,200 feet from the settling tank. The proposed settling tank which is to be divided into two compartments is to be 5 feet wide, 10 feet long and 7½ feet deep inside dimensions with a depth below the flow line of about 5¾ feet. It will have a capacity of approximately 2,100 gallons and, therefore will give about one day's detention of the sewage on the basis of design used.

The settling tank is so designed that the two compartments would operate in series. This arrangement does not appear to be satisfactory inasmuch as it will not permit of throwing one compartment out of use for cleaning without disturbing the flow through the other compartment. In order to facilitate cleaning of the tank each compartment should be provided with an independent inlet and outlet provided with valves so arranged that either or both compartments may be operated at one time.

I am of the opinion that very objectionable conditions would be created in the open ditch by the discharge of effluent from the settling tank into it. A closed pipe leading from the settling tank to the river should be provided. The company should also take steps to provide for at least a partial treatment by sedimentation of the sewage now discharged into the river from the hotel and from the employees' houses.

From our careful examination of the plans I am of the opinion that the proposed settling tank, if modified in accordance with the suggestions embodied in this report, should provide for the satisfactory treatment of the sewage from the toilet room at the mines.

I would, therefore, recommend that the plans be approved and a permit issued allowing the discharge of effluent from the proposed settling tank into the Little River on the following conditions:

1. That the effluent pipe from the settling tank be extended to the river.
2. That whenever required provisions be made for more complete treatment of the sewage in the toilet rooms.
3. That whenever required plans for the treatment of the sewage now discharged into the river from the hotel and from the buildings occupied by employees be submitted for approval.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *March* 12, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Benson Mines Company to discharge effluent from the proposed works to treat the sewage from the proposed new toilet room into the waters of Little river near the highway bridge within the town of Clifton in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewer and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof except as provided in condition 4 of this permit.

4. That the effluent pipe from the settling tank shall be extended to and into the river in such a manner as to be submerged at low water stage.

5. That whenever required by the State Commissioner of Health additional works for more complete treatment of the sewage from the toilet room shall be installed and put in operation in accordance with plans satisfactory to this Department.

6. That whenever required by the State Commissioner of Health satisfactory detailed plans for works to treat the sewage discharged from the hotel and from other properties owned by the Company shall be submitted for approval; and after approval of such plans any or all portions of such works shall be constructed and put in operation at such time or times thereafter as said Commissioner may designate.

LINSLY R. WILLIAMS,
Acting State Commissioner of Health

March 14, 1917

COLONIE (School District No. 2)

Plans for the disposal of the sewage from the school house, District No. 2, in the town of Colonie, Albany county, N. Y., by means of a settling tank and a subsurface irrigation field were approved by this Department on August 22, 1917.

CORNWALL (Firth Carpet Co.)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for the disposal of sewage and wastes from the factory of the Firth Carpet Company near Firthcliffe in the town of Cornwall, Orange county, submitted to this Department for approval on March 30, 1917.

These plans were first submitted for approval on February 22, 1917, and after a preliminary examination of them which showed that they were not in satisfactory condition for approval and did not contain sufficient data to permit of finally passing upon them they were returned to a representative of the company who called at the Department on May 21, 1917.

The factory of the Firth Carpet Company is located near Moodna creek at Firthcliffe about 2½ miles from the confluence of the creek with the Hudson river above Cornwall. The creek at this point has a drainage area of approximately 135 square miles. We have no record of any water supply being taken from this stream below the carpet works and it appears to flow for the most part through a sparsely developed section.

According to the data submitted with the plans the factory which employs some 540 men has an annual output of 3,500,000 yards of carpet. The sewage and wastes from the factory consist of sanitary sewage from the water closets and toilet room in the factory, some 5,000 gallons per day of wool scouring and wool yarn washings and some 110,000 gallons of wash water which it is understood contains starch, dyes, oil and other wastes.

It is planned at present to provide for the disposal of the sanitary sewage in a sewage disposal plant located near Moodna creek below the plant, and for the treatment of the wastes from the wool scouring and yarn washing processes in a grease recovery plant to be located at the factory. No provisions are made at this time for the disposal of the other wastes referred to and permission is asked by the company for an extension of time for the submission of plans for the disposal of these wastes inasmuch as it appears that the proposed method of treating these wastes has not been fully worked up by the company.

The disposal of sanitary sewage

The sanitary sewage from the toilet rooms of the plant is to be collected in a system of 6- and 8-inch sewers, at the upper ends of which are to be installed flush tanks. The sewage to be collected by these sewers is to be conveyed by gravity flow through some 1,200 feet of 8-inch sewer having a slope of .64 per cent to a disposal plant consisting of a screen chamber, a settling tank of the Imhoff type and a sludge drying bed for the disposal of sludge. This plant is to be located on the easterly side of Moodna creek and the plans indicate that an area has been reserved near the plant on which supplementary or more complete treatment works may be constructed in the future. It is planned to discharge the effluent from the settling tank at the edge of the stream about ½ foot above high water. This outlet sewer should, however, be extended well into the stream so that the outlet will be submerged at low water stage.

Screen chamber

This chamber is to be a small concrete structure 4 feet wide, 5 feet long and about 3½ feet deep inside dimensions. It is to be located near the inlet end of the settling tank and is to be provided with an inclined bar screen composed of ¼-inch by 2-inch wrought iron bars spaced 1¼ inches center to center.

Imhoff tank

The proposed tank is of the horizontal flow type and is to be divided by means of reinforced concrete partitions, into an upper settling compartment and a lower sludge compartment. The settling compartment has a capacity of some 6,900 gallons and will, therefore, give an average time of detention of the sewage of about 6 hours assuming a per capita rate of sewage contribution of 50 gallons per day. The sludge compartment has a capacity of about 950 cubic feet. The sludge is to be removed by gravity flow through an 8-inch cast-iron sludge pipe and discharged into an adjacent sludge bed.

Sludge bed

This bed has an area of 400 square feet and is to be filled to a depth of 12 inches with graded gravel ranging from 1/16-inch to 2½ inches in size and a top layer of mortar sand ¼-inch deep. The bed is to be underdrained by means of 3-inch vitrified tile pipe laid with open joints which are to discharge into a main drain 8 inches in diameter which in turn discharges into the outlet sewer from the settling tank.

Grease recovery plant

This plant is to consist of 4 so-called cracking and neutralizing tanks and 2 metal boiling tanks for the recovery of grease. The 4 large tanks are each to be 10 feet in diameter and 6 feet deep, giving a capacity of about 3,000 gallons for each. Each tank is to be provided with a mechanical stirring device. The pipe connected with the tanks are to be so arranged that the wastes may be discharged into either of the 4 tanks.

Although it seems that the piping system had not been fully worked out it appears from the specifications submitted with the plans that wastes are first to be discharged into the wooden tanks and there heated and made acid with oil of vitriol which it is claimed will separate the grease from the wastes and leave a fairly clear, yellowish liquid having a volume of about ¾ of the original liquor. This clear liquor is to be discharged onto the sludge drying bed divided into 2 compartments having an area of 200 square feet each. The filtering material as in the case of the sludge drying bed of the sewage disposal plant is to consist of 12 inches of graded gravel ranging in size from 1/16 inch to 2½ inches and a top layer of mortar sand ½ inch deep.

The sludge in the wooden tanks resulting from the treatment of the wastes with the oil of vitriol is then to be discharged into the metal tanks where it is to be treated with caustic lime and boiled until most of the grease separates and can be skimmed off. The sludge remaining in these tanks will then be discharged on the sludge bed.

It appears that the proposed method of recovering the grease is to be similar to other grease recovery plants that have been installed at other places in connection with wool scouring operations and found to operate satisfactorily. It is important, however, that this plant shall at all times be under skilled and intelligent supervision and that it shall be operated with care and efficiency. It is possible also that it may be found necessary to neutralize the acidity in the effluent from the sludge bed by the application of alkaline before the discharge of the effluent into the stream.

Incinerator

Plans for an incinerator were also submitted in connection with the disposal of wastes and sewage. According to the plans and specifications the incinerator is to be installed for the purpose of consuming certain solid waste of the plant. The approval of these plans for the incinerator have not, however, been considered inasmuch as there will be no liquid wastes resulting from its operation.

Conclusions and recommendations

From our careful examination of the plans, I am of the opinion that the proposed sewage disposal plant and the grease recovery plant if properly constructed and if maintained with care and efficiency should produce effluents that may be discharged into Moodna creek without objection at this time. Plans for the treatment of the wastes not provided for by the present plans should be submitted by the company at an early date. It is possible that it may be found necessary in the future to provide for an additional treatment of the sanitary sewage and of the effluent from the sludge bed to be installed in connection with the grease recovery plant.

I would therefore recommend that the plans be approved on the following conditions:

1. That whenever required, plans for a supplementary or more complete treatment of the sanitary sewage of the Firth Carpet Company shall be submitted to this Department for approval.
2. That whenever required, plans for additional treatment of the effluent from the grease recovery plant shall be submitted for approval.
3. That on or before August 1, 1917, plans for the treatment of the wastes not to be cared for by the present plant shall be submitted to this Department for approval.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *April* 12, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Firth Carpet Company to discharge effluent from the proposed works to treat the factory or industrial wastes from the plant of said Company near Firthcliffe, into the waters of Moodna creek at the point of discharge shown by the plans

within the town of Cornwall in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That the waste disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That only industrial or factory wastes and no storm or surface water from grounds, roofs or other areas shall be discharged into the works for treatment of industrial wastes.
5. That no sludge or scum from any part of these works shall be discharged into Moodna creek or any other watercourse.
6. That whenever required by the State Commissioner of Health satisfactory detailed plans for supplementary or additional works for more complete treatment of the industrial or factory wastes from the plant shall be submitted for approval; and after approval of said plans such works shall be constructed and put in operation at such time as said Commissioner may designate.
7. That on or before August 1, 1917, plans for the treatment of the wastes from the plant which are not to be treated in the works now proposed shall be submitted to this Department for approval.

M. NICOLL, JR.,
Deputy State Commissioner of Health

April 17, 1917

CROTON-ON-HUDSON

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewerage and sewage disposal for the village of Croton-on-Hudson, Westchester county, submitted to this Department for approval by the Board of Trustees on February 27, 1917.

These plans were previously submitted for approval on February 21, but they were not presented in duplicate nor accompanied by an engineering report and were returned to the designing engineers on February 21. According to the report and data submitted with the plans, it appears that the village is provided with a public water supply system installed in 1910. Since the installation of the water supply cesspools have been constructed in the various parts of the village many of which either overflow onto the surface of the ground or drain into small streams giving rise to objectionable conditions. Along the river front private sewers discharging directly into the river have also been constructed. The water supply of the village is derived from wells located along the northerly bank of the Croton river about 1,500 feet below the Croton Dam. The daily water consumption is about 150,000 gallons a day.

The population of the village in 1915 was 2,243 and the area of the village according to the report of the engineers is 406, so that the average density of population is about 5.5 persons per acre. The growth of the village has been moderate and based on an average density of 20 persons per acre it is estimated that the ultimate population to be served by the system as designed will be about 8,000 persons.

Sewer system

The proposed sewer system has been designed to care for sanitary sewage only. The sewers comprising the system vary in size from 8 to 15 inches in diameter except the outlet sewer leading from Riverside avenue to the disposal plant which is to be 20 inches in diameter. The sewers are for the most part to be constructed on fairly steep slopes and manholes are to be installed at all points of change of slope and alignment. Flush tanks are to be placed at the upper ends of nearly all lateral sewers.

Inverted siphon

The sewage from the northerly portion of the village is to be carried under a small brook which flows through the village near Brook street by means of an inverted siphon in Riverside avenue. The line leading to the siphon is to be 15 inches in diameter. The siphon which is to be of 16-inch cast-iron pipe is to be about 20 feet long. The inlet and outlet ends of the siphon are to consist of "Y" branches which will facilitate cleaning the siphon. Although it is usual to have inverted siphons constructed with duplicate pipes so arranged that either or both pipes may be used at one time, it may not be necessary at this time to provide for two pipes owing to the comparatively short length of the siphon and the relatively large size of pipe in this case. An additional pipe can be added whenever required. The bottom of the outlet manhole of the siphon should, however, be provided with channels so as to facilitate the flow through the outlet manhole into the main outfall sewers.

Sewage disposal

It is proposed to treat the sewage of the village in a sewage disposal plant consisting of a screening plant and a chlorination plant with provisions for pumping the effluent at certain high water stages of the river. The disposal plant is to be located near the bank of the Hudson river on the southerly side of the dock near the foot of Brook street extended. It appears from data furnished by the designing engineers that it was found to be impracticable to convey the sewage to a site more remote from the developed sections of the village without pumping.

Screening plant

The sewage upon reaching the disposal plant is first to be passed through an inclined bar screen composed of ½-inch by 3-inch bars spaced 2 inches in the clear. After passing through this screen it is to flow through a covered concrete channel to a Riensch-Wurl screen 8 feet in diameter having perforations ¾ inches wide and 2 inches long. The screened effluent from this fine screen is to flow into an outlet chamber or pump well near the entrance of which provisions are made for treating it with liquid chlorine. The pump well has a capacity below the average high water mark of about 3,000 gallons. Under ordinary conditions the treated sewage is to be discharged into the Hudson river by gravity through a 12-inch cast-iron outfall sewer extending to a point within about 50 feet of the end of the dock. Provisions are made for by-passing the Riensch-Wurl screen in case of emergency. The sewage will, however, be passed through the bar screens at all times before being discharged into the river. As noted above the channel of flow between the bar screen and the Riensch-Wurl screen is shown covered by the plans. This channel should be left open or should be covered by a removable grating in order to make it readily accessible for cleaning and inspection.

On the cross section through the screen house the elevations of the average low water, the average high water and the maximum high water stages of the river at the disposal plant are marked —3.0, —0.0 and —2.0 respectively and the elevations of the invert of the sewer and of the inlet channel at the

Riensch-Wurl screen is marked — 0.5 which would indicate that the average high water mark of the river is ½ foot above the invert of the sewer at the plant. Graphically, however, the average high water mark is shown about 2 feet lower instead of ½ foot higher than the elevation of the invert of the sewer at the plant with a corresponding difference between this elevation and the elevations of the low and the maximum high water marks. This discrepancy is somewhat misleading and would indicate that there had been a mistake in drawing up the plans or that two different datum planes had been used in designing the plan. This matter was called to the attention of one of the designing engineers when he presented the plan. He stated that the graphical representation of the various stages of the river is not shown correctly on the plans but that the elevations marked on the plans in figures were correct.

It would appear therefore, that it will be possible for a considerable period in the future to operate the plant by gravity flow at all stages of the river below average high tide. When the water in the river is above the average high water mark it is planned to close the inlet end of the effluent pipe at the pump well by means of a hand operated 18-inch sluice gate and to pump the effluent from the pump well into the river through the effluent pipe with 2 6-inch centrifugal pumps located in a dry well adjacent to the pump well. These pumps which are to have a capacity of 900 gallons per minute each under a head of 10 feet are to be driven by 2 automatically operated 10 horsepower electric motors. An electric signal device is to be installed to notify the operator in case of a failure of the pumping equipment.

Chlorination plant

The plans provide for treating the screened effluent with liquid chlorine. According to the report of the designing engineer the chlorine apparatus is to be of the Wallace & Tiernan type or equal and is to be capable of applying from 10 to 70 pounds of chlorine per day. It is presumably intended to sterilize the effluent on account of the bathing beach which it is understood is located on Croton Point from ¾ to 1 mile from the disposal plant. In view of the fact that this bathing beach is well removed from the point of discharge of the effluent and since sterilization of sewage effluents in this district has not been required, it would hardly seem necessary that sterilization should be provided at this time except possibly during the summer months if the village should so desire. If the sterilizing apparatus is to be used, I am of the opinion that not less than 10 parts of chlorine gas per million parts of sewage treated should be applied. This would be equal to about 83 pounds of chlorine per million gallons of sewage treated.

Conclusions and recommendations

From our careful examination of plans it is found that the proposed sewer system and sewage disposal plant if properly constructed and if maintained with care and efficiency should satisfactorily meet the local requirements. The proposed disposal plant should produce an effluent that may be safely discharged into the river at this time without objection. It will be necessary, however, to at all times have the plant operated under intelligent supervision in order to obtain satisfactory results and the village authorities should, therefore, provide for the proper supervision and operation of the plant. If the plant is neglected it will soon be out of repair and the function for which it was designed will be largely if not wholly defeated.

In view of the above I would recommend that the plans be approved and that a permit be issued allowing the discharge of effluent from the proposed sewage disposal plant into the Hudson river near the foot of Brook street. I would further recommend that the permit contain in addition to the usual revocation, modification and restriction clauses the following conditions:

1. That the channel between the bar screen and the Riensch-Wurl screen be left open or covered with removable gratings.
2. That whenever required plans for additional or more complete treatment of the sewage of the village shall be submitted for approval.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *February* 28, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Trustees of the village of Croton-on-Hudson to discharge effluent from the sewage disposal works to be constructed in connection with the proposed sewer system for the village into the waters of Hudson river near the foot of Brook street within the municipality of Croton-on-Hudson in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
5. That no sewage sludge or screenings from any part of the disposal works shall be discharged into the Hudson river or any other watercourse.
6. That the channel to convey sewage from the bar screen to the Riensch-Wurl screen shall be open or be covered by removable grating.
7. That whenever required by the State Commissioner of Health satisfactory detailed plans for additional works for more complete treatment of the sewage of the village of Croton-on-Hudson shall be submitted for approval; and after approval of the said plans any or all portions of such additional or supplementary works for more complete treatment of the sewage shall be constructed and put in operation at such time or times thereafter as said Commissioner may designate.

LINSLY R. WILLIAMS,
Acting State Commissioner of Health

March 2, 1917

DELHI (Delhi Products Co.)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for the disposal of wastes from the Delhi Co-operative Creamery at Delhi, Delaware county, submitted to this Department for approval on June 7, 1917.

According to the data submitted by the designing engineer the plant of this company is to be used as a skimming station where it is proposed ultimately to handle about 6,000 gallons of milk per day. Although the plant is

equipped to make butter it is not expected that any will be made at this plant and no cheese will be manufactured so that there will be no whey or buttermilk to care for. The wastes at the plant are to consist of floor washings and wash water from milk cans and utensils and are estimated at 600 gallons per day.

It is proposed to treat these wastes in a disposal plant consisting of 6 settling tanks having a capacity equal to about 800 gallons each or somewhat in excess of one day's flow of wastes. Each tank is to be 8 feet long, 4 feet wide by 4 feet 6 inches inside dimensions with a depth below the flow line of 3 feet 6 inches. A baffle is to be placed in front of the inlet and outlet of the tank. The baffles are shown extending only a few inches above the flow line of the tank.

Although the settling tank appears to have more than ample capacity to care for one day's flow of sewage, I am of the opinion that better results would be obtained if the tank be increased in depth to not less than 5 feet below the flow line. This change could be made without increasing the capacity of the tank by decreasing the length and the width of the tank sufficiently to obtain the required capacity. The baffle board should also be raised to an elevation not less than 9 inches above the flow line of the tank.

The tanks are to be operated in rotation on successive days. The tank filled one day is to be allowed to stand full for 4 or more days before it is emptied. After a certain amount of sludge has accumulated the supernatant liquid will be drawn off and the sludge allowed to stand for a month or more until it is thoroughly decomposed. If this long period of detention of the sludge should not prove satisfactory or give rise to objectionable conditions the sludge could of course be drawn off at more frequent intervals.

No statement is made nor do any provisions appear to have been made for the disposal of sludge. The sludge should not be discharged into any stream or other body of water but should be buried at a sufficient distance from any building to prevent the creation of objectionable conditions.

The effluent from the settling tanks is to be discharged into the Delaware river through effluent pipe consisting of 780 feet of 6-inch tile pipe. According to the report of the designing engineer a fall of 22 feet is available, equal to an average slope of 2.8 per cent.

From our careful examination of the plans it would appear that the proposed disposal plant should satisfactorily care for the wastes from the creamery if modified in certain respects as indicated above. I would, therefore, recommend that the plans be approved on the following conditions:

1. That the depth of the settling tanks be increased to not less than 5 feet below the flow line without increasing the capacity of the tank.
2. That the baffles near the inlet and outlet of the tanks be raised to an elevation of not less than 9 inches above the flow line of the tanks.
3. That whenever required plans for supplementary or more complete treatment of the wastes shall be submitted for approval.

Respectfully submitted.
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 22, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Delhi Products Company, Inc., to discharge effluent from the proposed works to treat the waste water and washings from the creamery of said company at Delhi into the waters of Delaware river near said creamery within the municipality of Delhi in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That no human excreta or washings and no whey, skimmed milk or other liquid wastes containing considerable amounts of putrescible organic matter shall be discharged into the settling tanks.
4. That no sludge or scum from the settling tanks shall be discharged into the Delaware river or any other watercourse or body of water.
5. That the depth of the settling tank shall be increased to not less than 5 feet below the flow line, the width and length of the tanks being decreased if desired to maintain the capacity as shown by the plans.
6. That a baffle near the inlets and outlets of the tank shall be raised to the elevation of not less than 9 inches above the flow line of the tanks.
7. That whenever required satisfactory detailed plans for supplementary or more complete treatment of the wastes shall be submitted to this Department for approval; and that after approval such works shall be constructed and put in operation whenever required by the State Commissioner of Health.

M. NICOLL, JR.,
Deputy State Commissioner of Health

October 8, 1917

DELHI (N. Y. State School of Agriculture)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of revised plans for sewage disposal for the Home Economics Building of the New York State School of Agriculture and Domestic Science at Delhi, resubmitted to this Department for approval by the State Architect on May 31, 1917.

These plans were first submitted for approval by the State Architect on April 18, but it was found from our preliminary examination of them that although they had in general been designed to meet the local requirements for sewage disposal, the subsurface irrigation system should be extended and modified and the plans were accordingly returned to the State Architect for modification on April 24, 1917.

The plans now submitted provided for a sewage disposal plant consisting of a settling tank, dosing tank and subsurface irrigation system divided into two sections. According to the data submitted with the plans the maximum number of students to be cared for at the Home Economics Building will be 60 and the water consumption is estimated at about 30 gallons per capita. The report submitted with the plans states that the soil at the site of the subsurface irrigation field is of a loose gravelly nature for a depth of several feet and well adapted for the disposal of sewage by means of subsurface irrigation.

The settling tank is to be 11 feet long, 5½ feet wide and 5½ feet deep inside dimensions with a depth below the flow line of 4½ feet. The tank will, therefore, have a capacity of approximately 2,000 gallons and will provide for a detention of the sewage of about 1 day when serving 60 persons based on an assumed daily sewage contribution of 30 gallons.

The tank is provided with a 4-inch sludge pipe controlled with a 4-inch gate valve. This pipe terminates at a plugged outlet about 25 feet from the tank. No statement is made as to the method of disposal of the sludge. The sludge should be disposed of on a properly constructed sludge bed or it should be deposited in trenches and burned at a sufficient distance from any building to prevent the creation of objectionable conditions and sufficiently far from any stream or body of water to prevent its contamination.

The dosing tank is to be located adjacent to the outlet end of the settling tank and the settled effluent is to flow from the settling tank through a submerged outlet into the dosing tank. This tank is to be provided with an automatic discharge siphon by means of which the effluent is to be discharged intermittently into the subsurface irrigation system. A gate chamber or manhole is to be provided at the upper section of the subsurface irrigation system on the line of the outlet pipe from the dosing chamber. Two branches each of which is to be provided with a 4-inch gate valve, extend from the manhole to the distributing system of the subsurface irrigation field.

This distributing system is to consist of 2 4-inch mains laid with cemented joints and 12 lines of 4-inch laterals 100 feet long each laid with open joints on slopes of 5 inches per 100 feet. The lines are spaced 10 feet apart and are to be laid at a depth of 12 inches below the surface of the ground. The joints of the lateral distributors are to be protected with strips of tar paper and surrounded with coarse material such as broken stone or gravel.

The system will contain 1,200 feet of distributing tile equal to 20 feet per person and will cover an area of approximately ⅓ acre. The rate of operation will, therefore, be about 10,000 gallons per acre per day on the basis of design used. This is a moderate rate under the proposed conditions.

The subsurface irrigation system is to be located at the foot of a fairly steep slope and I am of the opinion that the area of the field should be protected against surface wash by the construction of a gutter on the upper side of the field by means of which the surface water may be intercepted and carried around the field thereby preventing the field from being washed out or injured by heavy storms. It may also be found necessary to construct a drained trench about 1 foot wide and 4 feet deep filled with broken stone or gravel above the disposal area for the purpose of intercepting the ground water flow during wet seasons of the year.

From our careful examination of the plans I am of the opinion that the proposed sewage disposal system should satisfactorily care for the sewage of the building to be served by it, assuming that the population to be cared for will not exceed 60 persons. There appears moreover, to be sufficient area available to permit of extending the subsurface irrigation system in the future if necessary.

I would, therefore, recommend that the plans be approved on condition that a gutter be constructed on the upper side of the subsurface irrigation field for the purpose of intercepting and carrying off surface water.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 6, 1917

The plans were approved June 7, 1917.

DRESDEN (H. W. Starr)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of plans for a sewage disposal system at the residence of Howard W. Starr near Huletts Landing, town of Dresden, Washington county.

These plans which were submitted for approval on August 24, 1917, comprise:

1. A plan in duplicate showing general layout and sections
2. A U. S. Geological Survey map showing location of residence.

The residence of Mr. Starr is only occupied during about four months in the summer and the population contributing sewage is said to be about ten. With an estimated amount of sewage of 100 gallons per capita per day the total amount will probably be about 1,000 gallons per day.

The proposed disposal plant is to consist of settling tank, a dosing tank and two intermittent sand filters. The effluent will be discharged into Lake George.

The settling tank is to be 5 x 8 feet in plan and is to have a depth of 5 feet and a capacity of 1,500 gallons which corresponds to about 1½ days' flow of sewage.

The dosing tank is to be 5 x 6 feet in plan and will have an effective depth of 2 feet, giving a capacity of 450 gallons, and will, therefore, be emptied about two times a day. An automatic siphon is to intermittently discharge the contents of the tank to one or both sand filters. The siphon is placed outside of the dosing tank and no provision is made for inspecting or repairing siphon, except by excavating fill around siphon.

The sand filters are two in number and are to be 20 x 21¾ feet in size and contain 3 feet of sand. The tank effluent is to be distributed on each filter by means of two troughs placed on the surface of the beds. The underdrains in each bed are to consist of two lines of 4-inch tile pipe laid with open joints. The effective size and the uniformity coefficient of the sand to be used in the filter beds are not given. The effective size should range from .20 to .35 mm. and the uniformity coefficient of the sand should not exceed 4, and preferably should not be greater than 3. About one foot above the surface of the sand is to be placed a cover of 2-inch planks which in turn are to be covered with about 10 inches of soil. One discharge from the dosing tank is sufficient to cover a filter about 1½ inches with sewage. Assuming a flow of 1,000 gallons per day, the rate of treatment of the sand filters will be 50,000 gallons per acre per day.

The designing engineers state that the effluent from the sand filter is to pass through about 140 feet of 4-inch tile pipe to a point about 200 feet from Lake George and above high-water mark, from which point it will pass over the surface of the ground to the lake.

From our careful examination of plans it would appear that they have in general been designed to meet our requirements. There are, however, certain modifications and additions which should be made.

I would, therefore, recommend that the plans be approved and that a permit be issued allowing the discharge of the effluent into the waters of Lake George and that the permit contain in addition to the usual revocation and modification clauses the following conditions:

1. That the sewage disposal plant shown by plans approved this day shall be fully constructed in complete conformity with such plans, except as modified by conditions 2, 3, and 4 given below.
2. That the siphon in connection with the flush tank be constructed in a chamber easily accessible in order that repairs may readily be made.
3. That the effluent pipe from the sand filters be extended into the lake so that the end shall at all times be under water.
4. That an inspection chamber be constructed on the final effluent pipe between the sand filters and the lake for the purpose of inspection and collection of samples.
5. That whenever, in the judgment of the State Commissioner of Health, additional or more complete treatment of the effluent is required, additional plans for such additional treatment shall be submitted to this Department for approval and after receiving such approval the additional works shall be constructed.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 12, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting

chapter 45 of the Consolidated Laws, permission is hereby given to Mr. Howard W. Starr to discharge effluent from the proposed sewage disposal plant at his residence, near Huletts Landing in the town of Dresden, into the waters of Lake George near his property within the town of Dresden in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That the sewage disposal plant shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof except as stated in conditions 5, 6 and 7 of this permit.
4. That only sanitary or domestic sewage and no storm or surface water from roofs or other areas shall be admitted to the proposed sewers.
5. That the siphon in connection with the flush tank be constructed in a chamber or manhole provided with a removable manhole cover.
6. That the effluent pipe from the sand filter be extended into the lake a sufficient distance so that the outlet shall at all times be completely submerged.
7. That an inspection chamber be constructed on the line of the effluent pipe between the sand filter and the lake.
8. That whenever required by the State Commissioner of Health satisfactory detailed plans for additional works for more complete treatment of the sewage of the residence of Mr. Howard W. Starr shall be submitted for approval; and after the approval of said plans any or all portions of such additional or supplementary works for more complete treatment of sewage shall be constructed and put in operation at such time or times thereafter as said Commissioner may designate.

M. NICOLL, JR.,
Deputy State Commissioner of Health.

September 12, 1917

EASTCHESTER (Town Sewer District)

Original plans for a comprehensive sewer system for the sewer district in the town of Eastchester covering all portions of the town outside of the incorporated villages of Bronxville and Tuckahoe were approved on November 12, 1912. These plans do not show details of all the sewers and pumping stations and were accordingly approved on the condition that plans for detailed plans for creek crossings and pumping stations be submitted for approval. On August 7, 1916, plans for a pumping station at the intersection of Highland avenue and California road were approved on the following conditions:

1. That the pump shall be provided with automatic control to start and stop the pumps.
2. That properly designed screen chamber shall be provided, so arranged that the sewage shall flow downward through an inclined bar screen and that the plans for such screen chamber shall be submitted to this Department for approval before the screen chamber is constructed.

The present plans provide for a screen chamber to be located adjacent to the pumping station. This chamber, which is to be circular in plan, is to be 6 feet in diameter and is to be provided with an inclined bar screen composed of ⅜ inch by 1½-inch bars spaced 1¼ inches apart. The screen is to

be supported on the bottom of the screen chamber and on the edge of the operating platform which will occupy one-half of the vertical projection of the screen chamber. This screen chamber will also act as a suction wall for the proposed ejector. When the sewage in the screen chamber reaches a certain level it will overflow through an 8-inch pipe into a circular suction well to be operated in connection with the centrifugal pumps at the pumping station.

The pumping plant is to be equipped with a Priestman ejector having a capacity of 50 gallons per minute and 2 centrifugal pumps having a capacity of 160 gallons per minute each. The air compressor to be operated in connection with the ejector is to be driven by a 6 horsepower electric motor. One of the centrifugal pumps is to be operated by a similar motor and the other pump is to be operated by a gas engine. This engine can also be made to operate the air compressor. The pumps and ejectors are to be operated automatically by means of floats and switches located in the screen chamber.

The general plans for the sewer system approved in 1912 showed 10,000 feet of sewers tributary to this pumping station. Assuming that the lots are 50 feet wide and that each lot will be occupied by a house containing 5 persons on the average, the population tributary to the pumping station will be 2,000, and the estimated maximum rate of sewage contribution will be 275 gallons per minute. The capacity of the pumps at the pumping station will be about 370 gallons per minute. It appears therefore that the plans provide for a reasonable factor of safety.

The plans, if properly carried out, should satisfactorily meet the requirements for which the pumping station was designed.

ALBANY, N. Y., *March* 16, 1917.

The plans were approved March 22, 1917.

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for a proposed intercepting sewer in the sewer district of the town of Eastchester, Westchester county, submitted to this Department for approval by the sewer commissioners of the town on August 17, 1917. Additional plans and data were submitted at our request on September 8 and October 1, 1917, and conferences were held with the engineer for the sewer commission, both at this office and at his office in Mount Vernon.

Original plans for a sewer system in the sewer district were approved on November 27, 1912. This district is located on both the Bronx river and the Hutchinson River watersheds. The plans approved provided for the discharge of sewage from the western portion of the district into the Bronx Valley sewer by gravity flow and the discharge of sewage from the northerly portion of the eastern section of the sewer district into five pumping stations by means of which the sewage was to be pumped into the system tributary to the Bronx Valley sewer. These pumping stations were shown located at Highland avenue, Mill road, Water street, Wilmot road and Hutchinson boulevard, not far from the reservoirs of the New Rochelle Water Company. The plans, however, did not show details of these pumping stations nor had it been definitely determined as to whether the sewage from the southern portion of the eastern section of the sewer district was to be pumped to the Bronx Valley sewer through the Bronxville sewer system or discharged by gravity flow through the Mount Vernon sewer system. The plans were, therefore, approved on condition that before the construction of sewers in the eastern section of the Eastchester sewer district more definite and complete plans, including details of ejectors or pumping stations and of cast iron pipe be submitted for approval.

On December 3, 1913, plans for proposed sewers in the Paulding Manor section in the southern part of the sewer district were submitted for approval. It appeared from the report of the designing engineer submitted with these

plans that the method of finally disposing of the sewage to be collected by these sewers, that is, whether the sewage would be discharged into the Bronx Valley sewer by pumping or into the Mount Vernon sewer system by gravity, had not been definitely determined upon but that approval of the plans was desired at that time in order that the sewers might be installed before the construction of pavements in certain streets of this section. The plans were accordingly approved on December 12, 1913, on condition "that no sewage be discharged into the proposed sewers and that the remaining sewers of the eastern portion of the sewer district in the town of Eastchester be not constructed until more definite and complete plans including details of design of sewers crossing the streams, of outfall sewers, of pumping stations and of force mains shall be submitted to this Department for approval."

On November 3, 1915, plans for proposed sewer extension between New Rochelle avenue in the Paulding Manor section in the town of Eastchester and Hutchinson boulevard in the city of Mount Vernon tributary to the sewer system and sewage disposal works of Pelham were approved and a permit issued allowing the discharge of sewage from the proposed sewer into the Hutchinson river through the outlet of the Pelham sewage disposal works.

In the early part of 1916 this Department was advised by the New Rochelle Water Company that sewage pumping stations had been constructed by the Eastchester sewer district near the reservoirs of the water company, and that in their opinion the pumping equipment of the pumping stations was inadequate. Attention of the sewer commissioners was immediately called by this Department to the necessity of submitting plans in accordance with the condition of approval of the original and subsequent plans for sewers in the sewer district. Considerable correspondence and a number of conferences were subsequently had with the representatives of the water company and the sewer commissioners. It was found that, although a number of pumping stations had been constructed, only one of the pumping stations serving one house had been put in operation.

It was finally agreed at a joint conference between the sewer commissioners of the Eastchester sewer district, representatives of the New Rochelle Water Company and the chief engineer of this Department on June 6, 1917, that the pumping stations in the Eastchester sewer district located near the reservoirs of the New Rochelle Water Company which furnishes the water not only for New Rochelle but also for adjacent municipalities including the town of Eastchester, would be abandoned and intercepting trunk sewers constructed along the reservoirs to convey the sewage by gravity flow to a point below the dam of the lower reservoir in order to better safeguard or protect the water supply furnished by the New Rochelle Water Company.

The plans now submitted provide for the interception of the sewage tributary to the pumping station at the intersection of Highland avenue and California road by means of an intercepting trunk sewer extending along the reservoirs and through the property of the New Rochelle Water Company from Highland avenue to the existing sewer in California road below the lower reservoir of the water company. According to the report of the engineer for the sewer commissioners, submitted under date of September 24, it is proposed to construct this section of the intercepting sewer only at this time and to postpone the construction of the sections above Highland avenue for two or three years and detailed plans for the upper sections intercepting sewer from Wilmot road to Highland avenue, for the interception of the sewage tributary to the Wilmot road, Mill road and the Water street pumping stations, are to be submitted at a later date.

The sewage to be collected by the proposed intercepting sewer below Highland avenue is to be discharged into the Hutchinson river through existing sewers in the town of Eastchester into the Mount Vernon sewer system and sewage disposal plant. This sewer will ultimately serve the area tributary to the pumping stations on the westerly side of the reservoirs of the New Rochelle Water Company which are to be abandoned. Only one of these pumping stations, the one at Water street, which serves one house, is now

in operation. It is understood that this pumping station is to be abandoned and the sewage tributary to it cared for by means of cesspools.

The proposed sewer is to be 12 inches in diameter and is to be constructed with a slope of .25 per cent except for a short section of the lower end near California road, where the slope will be 2.665 per cent. Manholes are to be constructed along this line at all points of change of slope and alignment and at intermediate points not more than 450 feet apart. According to the plans and report submitted with them the sewers are to be constructed of vitrified tile pipe with bituminous joints and cradled in concrete where necessary, and cast-iron pipe is to be used at all crossings of watercourses or where the soil is soft.

The invert of a section of the sewer between Stations 20 and 21 is shown to be about one-half foot above ground. This section should be constructed of cast-iron pipe with leaded joints and a cover of not less than 3½ feet over the sewer should be provided. In no place along the line of the sewer should the cover be less than 3½ feet.

The proposed sewer will have sufficient capacity to care for only about 5 persons per acre on the area within the sewer district that will ultimately be served by it on the usual assumptions as to per capita rates of sewage contribution.

Although it will have ample capacity to care for the sewage from the area to be tributary to it not only at present but for a reasonable period in the future it may be found necessary to increase the size of this sewer or to construct an additional sewer before the section of the town tributary to it is fully developed. Consideration should, therefore, be given by the sewer commissioners to the advisability of now enlarging this sewer to 15 inches in diameter.

From our careful examination of the plans it would appear that they have been, in general, designed to meet our requirements and I would, therefore, recommend that the plans be approved on the following conditions:

1. That the joints of the sewers be made as water tight as possible and that when necessary to prevent pollution of the reservoirs of the New Rochelle Water Company the sewers shall be constructed of cast-iron pipe with leaded joints.
2. That the section of the sewers to be laid above natural grade of the ground be constructed of cast-iron pipes with leaded joints.
3. That a cover of not less than 3½ feet over the sewer be provided.
4. That detailed plans for the intercepting sewers between Wilmot road and Highland avenue be submitted for approval.

Respectfuly submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 1, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Eastchester Sewer Commission to discharge sewage from the proposed intercepting trunk sewer into the waters of Hutchinson river through the Mt. Vernon sewage disposal works, within the municipality of Mt. Vernon, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That the proposed sewers shall be constructed in complete conformity with the plans or approved amendments thereof except as provided in subsequent conditions of this permit.

4. That proper provision shall be made either separately by the Eastchester Sewer Commission or by arrangement with the authorities of Mt. Vernon or other municipalities for adequate treatment of the sewage to be collected by the proposed sewers in a manner satisfactory to this Department.

5. That the joints of the sewers shall be made as water tight as possible and that where necessary to prevent pollution of the reservoirs of the New Rochelle Water Company, the sewer shall be constructed of cast-iron pipe with leaded joints.

6. That the section of the sewer to be laid above the natural grade of the ground shall be constructed of cast-iron pipe with leaded joints.

7. That a covering of earth not less than 3½ feet deep at all points shall be placed over the sewer.

8. That detailed plans for the intercepting sewers between Wilmot road and Highland avenue shall be submitted to this Department for approval before such sewers are constructed.

M. NICOLL, JR.,
Deputy State Commissioner of Health

October 1, 1917

GREECE (Rochester Folding Box Co.)

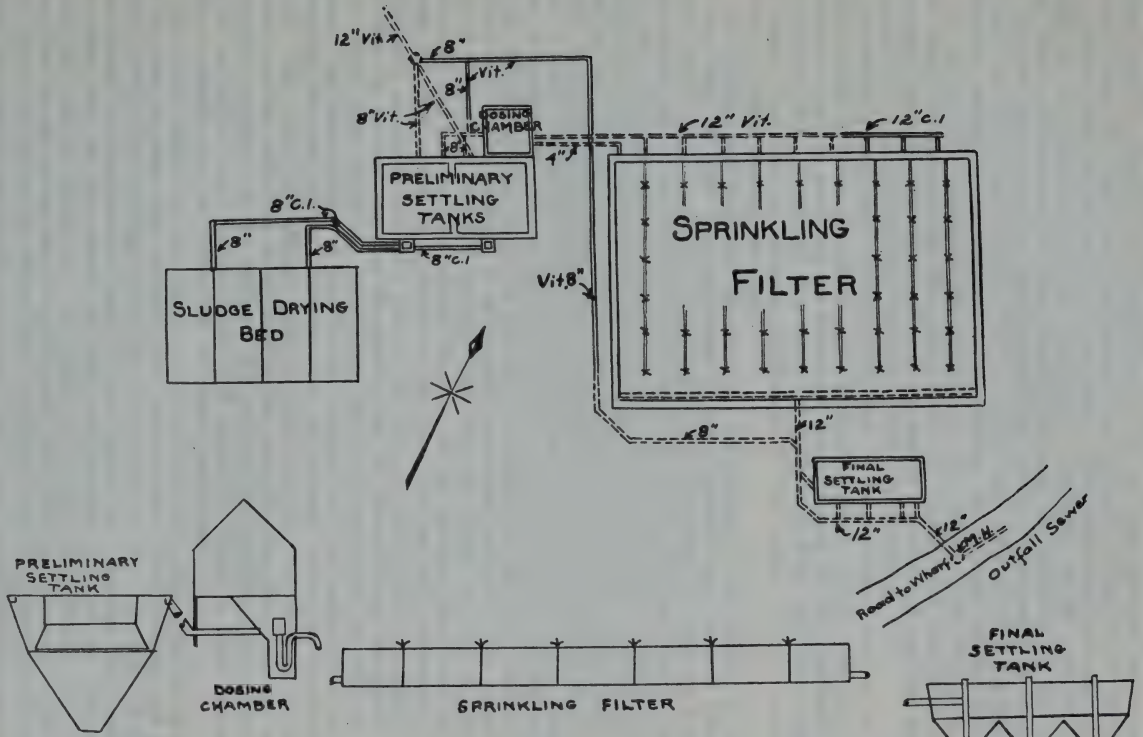
HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the examination of plans for the disposal of sewage from the factory of the Rochester Folding Box Company in the town of Greece, near Rochester, Monroe county, N. Y., submitted to this Department for approval on November 19, 1917.

The factory of the Rochester Folding Box Company is located on the west side of the Genesee river about 1½ miles north of the city of Rochester, and when put in operation will employ about 650 people. It is estimated that the sewage flow from the factory will amount to approximately 6,500 gallons per day, the larger part of which will reach the proposed sewage disposal plant during the working day of 8 hours. According to the report accompanying the plans, the soil in the vicinity of the plant is "clay, sand and gravel," overlying shale rock; and the ground water level is about 10 feet below the surface. There are no wells on or near the property. The water supply for the factory is to be taken from the mains of the Ontario Water Company.

The plans as submitted contemplate the construction of a disposal plant comprising a settling tank, dosing chamber and contact bed, to be located about 700 feet northeast of the factory. An 8-inch tile sewer will conduct the sewage to the plant, and the effluent will be discharged through a sewer of the same size into an old field drain which leads to a small brook tributary to the Genesee river.

The settling tank, as shown on the drawings, is a covered concrete structure 20 feet long, 5 feet wide and 5 feet 6 inches deep, having a capacity of approximately 4,000 gallons. With the estimated flow of 6,500 gallons per day this capacity will furnish an average detention period of about 14 hours. The flow enters the center at one end of the tank 8 inches above the normal water line and leaves at the center of the opposite end. No baffle or shield is provided at the inlet to prevent the incoming sewage from disturbing the contents of the tank. The outlet is fitted with a "T" extending about 18 inches below the surface to prevent scum and floating material from leaving



SEWAGE DISPOSAL PLANT
KINGS PARK STATE HOSPITAL
KINGS PARK, L.I.
To accompany report of Jan. 15, 1917

Scales:-
PLAN
20 40 80 120 160
SECTION
10 20 40 60 80

SWIMMING POOL
FILTERS

the tank. A transverse concrete wall, 8 inches thick located near the center, divides the tank into two sections, and two 6-inch tile pipes set in the wall about 3 feet above the floor are provided for the passage of the liquid from one section to the other. The second section of the tank is fitted with a wooden baffle perpendicular to the line of flow and 4 feet 8 inches from the outlet end extending from a point 3 feet above the floor to a point about the water line of the tank. The transverse wall and wooden baffle are not necessary for the satisfactory operation of the settling tank, and their omission would undoubtedly increase the efficiency of the tank. A further improvement in the construction of the tank could be made by fitting the inlet pipe with a "T" or some form of baffle to prevent the incoming sewage from unnecessarily disturbing the contents of the tank.

No provision is made for the removal of the sludge from the tank, and the report accompanying the plans does not cover this matter. It is assumed, however, that the tank will be cleaned at intervals and the sludge disposed of in a manner that will not create any nuisance.

Immediately adjacent to the outlet end of the settling tank is a concrete dosing chamber of about 1,100 gallons capacity fitted with a 6-inch automatic siphon arranged to discharge the contents of the chamber into the contact bed. Assuming that the total daily flow from the tank is about 10 hours, the interval between discharges of the siphon will be approximately 2 hours during the day.

The contact bed provided for the final treatment of the sewage is to be 35 feet long, 25 feet wide and about 3 feet 6 inches deep, without floor or walls, built up of screened gravel varying in size from ¼ inch to 1 inch. Apparently the entire bed is to be covered with a fill of several feet of earth. The tank effluent will be applied to the bed through five lines of 6-inch hexagonal tile laid with open joints near the top of the bed, and the effluent will be collected by five similar lines laid on the bottom of the bed. As noted above, the effluent from the underdrains will be discharged indirectly into a small stream tributary to the Genesee river. Based on the assumed flow of sewage, the rate of application of the tank effluent to the bed will be about 350,000 gallons per acre per day, a reasonable rate for contact beds of ordinary construction. It is usually considered essential that a contact bed be thoroughly aerated between each dose or filling if it is to operate efficiently and give a satisfactory effluent. In the present case, however, the earth fill with which it is intended to cover the bed will apparently preclude such aeration; and the use of this bed, if constructed, as shown, will probably in no way improve the quality of the effluent from the plant.

It would seem advisable, considering the local conditions, to omit for the present the construction of the dosing chamber and the contact bed, and to discharge the tank effluent directly into the stream leading to the Genesee river. The tank and effluent pipe should, however, be arranged so that when required additions could readily be made to the plant for the more complete treatment of the sewage. To this end the settling tank should be set at as high a level as conditions will permit in order to allow as much fall as possible for the operation of future extensions.

The sewer leading to the plant is of 8-inch tile laid with a fall of ¼-inch to the foot, a grade that should prove satisfactory. No manholes are provided on the sewer although there are three sharp bends in the line. A manhole should be constructed at each of these bends for inspecting and cleaning the sewer and the pipe should be laid on a straight line and on a uniform grade between the manholes. The grade of the proposed effluent pipe from the plant is not given but should be not less than 0.5 per cent. The old field drain into which the effluent is to discharge should be carefully examined before the plant is put in operation, and if not found in satisfactory condition should be properly repaired.

In view of the results of our examination of these plans and after a careful consideration of the essential features of the design and of local conditions, I beg to recommend that the plans be approved and a permit issued for the discharge of the effluent from the disposal plant into a creek tributary to

the Genesee river in the town of Greece, Monroe county, on the following conditions:

1. That only sanitary sewage and no trade wastes, storm water and surface drainage shall be admitted to the proposed sewer or disposal plant.
2. That the transverse wall and wooden baffle be omitted from the settling tank, and that the inlet of the tank be so arranged that the incoming sewage will not unnecessarily disturb the contents of the tank.
3. That the sludge from the settling tank shall be removed when necessary and disposed of by depositing on land in a manner and at a place that will not create any nuisance, and that such sludge shall, under no condition, be discharged into any watercourse.
4. That manholes shall be provided at all changes in grade or horizontal alignment of the sewers to be used in connection with the plant.
5. That the old field drain into which the effluent of the plant is to be discharged shall be inspected, and if necessary, be repaired before the disposal plant is put in operation.
6. That whenever required by the State Commissioner of Health additions to the plant for the more complete treatment of the sewage shall be constructed and put in operation.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *November* 23, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Rochester Folding Box Company to discharge effluent from the disposal plant to be constructed at their works near Rochester, into the waters of a creek tributary to the Genesee river within the town of Greece, Monroe county, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary sewage and no trade wastes, storm water and surface drainage shall be admitted to the proposed sewer or disposal plant.
4. That the transverse wall and wooden baffle be omitted from the settling tank, and that the inlet of the tank be so arranged that the incoming sewage will not unnecessarily disturb the contents of the tank.
5. That the sludge from the settling tank shall be removed when necessary and disposed of by depositing on land in a manner and at a place that will not create any nuisance, and that such sludge shall, under no condition, be discharged into any watercourse.
6. That manholes shall be provided at all changes in grade or horizontal alignment of the sewers to be used in connection with the plant.
7. That the old field drain into which the effluent of the plant is to be discharged shall be inspected, and if necessary, be repaired before the disposal plant is put in operation.
8. That whenever required by the State Commissioner of Health, additions to the plant for the more complete treatment of the sewage be constructed and put in operation.

M. NICOLL, JR.,
Deputy State Commissioner of Health

***November* 27, 1917**

GREENBURGH (Union Free School No. 9)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewage disposal for the Union Free School No. 9 of the town of Greenburgh at Elmsford, Westchester county, submitted to this Department for approval on June 7, 1917.

The question of the disposal of sewage from this school which is located at Elmsford, has been before the Department from time to time since December, 1915, and a number of sets of plans for sewage disposal all of which have been inadequate, have been submitted for approval. The present plans which were prepared by Mr. H. L. Quick, Architect of Yonkers, were first submitted for approval on May 23, 1917. It was found from our preliminary examination of them that although they had in general been designed to meet the local requirements for sewage disposal considering the limited area available for the disposal of the sewage on the school property, they were not in satisfactory condition for approval and were accordingly returned to the architect who prepared them on May 29, 1917, with the recommendations that they be modified in the following respects:

1. The elevation of (a) the main drain at the point where it leaves the school building, (b) the elevation of the flow line of the settling tank, (c) the elevation of the invert of both the upper and lower end of the concrete conduits or main distributing troughs should be shown on the plans.
2. The distance between the flow line and the cover of the settling tank should not be less than 12 inches.
3. The inlet end of the inlet pipe to settling tank should be so extended as to terminate at a point approximately but not more than 12 inches from the wall of the tank opposite the outlet end of the tank.
4. The sewer leading from the building to the settling tank should have as few turns in it as possible and a clean-out or inspection hole should be placed at each turn.
5. Each of the two lines between the two siphons of the dosing tank and the main distributing troughs or conduits should be provided with a valve or some other suitable means should be provided for shutting off the flow to either of the two sections of the subsurface irrigation system in order to permit of operating each section of the system on alternating weeks thereby providing for periods of rest.
6. The slopes of the lines of lateral distributors which slopes should not exceed 6 inches in 100 feet, should be marked on the plans and specified in the specifications.
7. No line of distributing tile should terminate nor be laid within 5 feet of the top of the terrace in front of the school.
8. The top of the 2-inch oak baffle plates in the main concrete distributing conduits should not be more than 4 inches above the invert of the conduits.
9. In addition to surface gutters for the protection of the subsurface irrigation field against surface wash a trench 1 foot wide and about 4 feet deep filled with gravel or broken stone and provided with a drain in the bottom should also be provided between the school building and the disposal area in order to intercept the flow of ground water from the hill above the school. Details of the surface gutters and trench should be shown on the plans.

The plans now submitted provide for a sewage disposal plant consisting of a settling tank, dosing chamber and subsurface irrigation system to be located on a terrace on the westerly side of the school. According to data submitted with the plans the soil at the proposed site is of a sandy and gravelly nature. The report of the architect states that the capacity of the present school building is 400 and that the new building to be constructed will contain 4 additional school rooms 2 of which will be used to care for the over-crowded conditions of the present school and the other 2 for

increased growth of the school and that the total capacity of both buildings will not be over 480. It is also stated that it is not contemplated that any additions will be made to the buildings now planned before the proposed Saw Mill River Valley trunk sewer which will serve this section is completed and put in operation.

Settling tank

The proposed settling tank is to be a covered concrete structure, 10 feet wide and 20 feet long and from 8 to 8½ feet deep inside dimensions with a depth of flow of from 7 to 7½ feet. The tank will have a capacity of about 10,000 gallons and will, therefore, hold from 1 to 2 days flow of sewage based upon a daily per capita rate of sewage contribution of from 10 to 20 gallons, which rate will probably not be exceeded inasmuch as none of the fixtures in the toilet rooms are to be flushed automatically.

The inlet pipe which is to consist of a 6-inch iron pipe extends into the tank to a point about 10 feet beyond the inlet end of the tank where it turns through an angle of 180 degrees and terminates at a point about 12 inches from the inlet end of the tank. I am of the opinion that it would be better not to have the pipe extend into the tank but to have it terminate flush with the inside of the wall at the inlet end of the tank and to place a baffle in front of the inlet about 12 inches in front of the inlet end of the pipe. This baffle should extend about 12 inches above and about 2 feet below the flow line of the tank. It would be well also to have the inlet end of the pipe level with the flow line of the tank.

No provisions have apparently been made for the disposal of sludge which will accumulate in the tank. The sludge should be removed at the close of the school year and should be hauled away and buried in trenches at some place sufficiently removed from any building to prevent the creation of objectionable conditions and sufficiently far from any stream or other body of water to prevent its pollution.

Dosing chamber

The dosing chamber is to be located adjacent to the settling tank and is to be separated from it by means of a wall in which is to be placed a submerged outlet. This tank is to be provided with two alternating discharge siphons and will have a sufficient capacity to approximately fill one section of the subsurface irrigation system at each discharge of the siphon.

Although siphons of this type will under normal conditions operate alternately and discharge the settled effluent alternately into the two sections of the subsurface irrigation system, a valve should be placed on each of the two lines from the siphons in order to permit of entirely shutting off the flow from either one of the two sections of the subsurface system for a period of a week or a month as may be required in order to allow the different sections of the field to rest and become dried out if necessary.

Subsurface irrigation system

This system is to be located below the settling tank on the westerly side of the school building and is to be divided into two nearly equal sections. The distributing system is to consist of two main concrete distributing troughs 8 inches deep and 8 inches wide each and 20 lines of 4-inch distributing tile laid upon 4-inch hollow tile. The main distributing troughs are to be covered and a removable stop plank 4-inches high is to be inserted in the distributing trough just beyond each lateral distributor. This arrangement should tend to give a fairly uniform distribution of the effluent through the system inasmuch as the upper lines of lateral distributors will be filled with sewage before it will overflow the stop planks to the next line of distributors.

The lines of lateral distributors are to be from 150 to 165 feet long and are to be laid in trenches on slopes of 6 inches to 100 feet. These trenches which are to be 2 feet deep and 12 inches wide are to be filled to a depth of

4 inches with broken stone and 4 inch hollow tile are to be laid on top of this material. The 4-inch distributors are to be laid above or on top of the 4-inch hollow tile and are to be surrounded and covered with broken stone to a depth of about 8 inches. The joints of the distributing tile are to be covered with strips of tar paper.

The system will contain approximately 3,200 feet of tile equal to about 8 feet per pupil served under the present conditions. The system will cover an area of about .3 acres and will, therefore, be required to operate at from 1,300 to 1,600 gallons per acre per day assuming a daily rate of sewage contribution of 10 gallons per pupil.

A gutter to carry off surface water and a trench to intercept ground water are to be installed on the easterly or upper side of the subsurface irrigation field. The trench which is to be 16 inches wide, 4 feet deep is to be filled with broken stone and is to be provided with 4-inch tile drain.

As pointed out by the architect it should not be necessary to run the trench along the entire length of the subsurface irrigation field inasmuch as the basements of the 2 school buildings will in all probability cut off the subsoil drainage or ground water from the portions of the field below the buildings.

It is noted that the specifications stipulate a slope of 1 foot per 100 feet for the distribution system of the subsurface irrigation field. The specifications should be changed to read 6 inches per 100 feet for the slope of the distributors.

Conclusions and recommendations

It is found from our careful examination of the plans that the proposed sewage disposal system has been designed to meet the general and local requirements for sewage disposal. The area available is limited, however, and owing to the fact that the system is to be located on a terrace it is possible that it will become necessary for the Board of Education to secure additional area for the disposal of sewage from the school if the school attendance is materially increased inasmuch as it is probable that the proposed system will not satisfactorily care for more than the present attendance at the school.

In view of the above I would recommend that the plans be approved on the following conditions:

1. That additional area for the disposal of sewage from the school be provided if necessary in the future.
2. That the inlet to the settling tank be modified as suggested in the body of this report.
3. That the sludge from the settling tank be properly disposed of as recommended in this report.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 7, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the trustees of Union Free School No. 9, town of Greenburgh to discharge effluent from the proposed sewage disposal plant at the school into the waters of the State tributary to the Saw Mill river within the municipality of Elmsford in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

4. That no sewage sludge from any part of the disposal works shall be discharged into Saw Mill river or any other watercourse or body of water but shall be disposed of in a sanitary manner as recommended in the report referred to below.

5. That additional area for the disposal of sewage from the school shall be provided if necessary in the future.

6. That the inlet of the settling tank shall be modified as stated in the body of the report on the examination of the plans a copy of which is this day being transmitted to the board of trustees.

M. NICOLL, JR.,
Acting Deputy State Commissioner of Health

June 18, 1917

HERKIMER

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for proposed sewer extensions in Main street, East German street, Fair avenue, Steuben street and other streets in the village of Herkimer, Herkimer county, N. Y., submitted to this Department for approval by the Municipal Commission on September 17, 1917.

The records of this Department show that plans for a comprehensive sewer system for the village of Herkimer were approved on March 15, 1893. Plans for extensions to this system were approved on October 6, 1908, and September 27, 1912. The permit issued on September 27, 1912, contained the following condition:

> "That on or before February 1, 1913, satisfactory detailed plans for preliminary purification or clarification by sedimentation of the entire sanitary sewage of the village of Herkimer * * * be submitted to this Department for approval."

On April 29, 1913, the time for submitting these plans was extended to June 1, 1913. Plans for a sewage treatment plant comprising septic tanks and sludge beds were submitted for approval on July 11, 1913. These plans were approved on July 25, 1913, and on the same date a notice was sent to the Municipal Commission of the village of Herkimer (in accordance with section 77 of chapter 45 of the Consolidated Laws) directing them to construct the plant and have it in operation on August 1, 1914.

The Municipal Commission of the village under date of October 12, 1917, now ask for an extension of time for constructing the disposal works, stating that the expenditures recently made in improving their water supply and the present high prices of labor and material make it almost impossible for them to undertake any construction work at the present time.

The plans now submitted contemplate the construction of sewer extensions in various parts of the village totalling about 11,000 feet of 10-inch and about 7,000 feet of 8-inch vitrified pipe sewer.

The capacities of the proposed sewers are in all cases ample to care for the sewage that will come to them, and with the exception of the lines in the section known as "The Riverview Addition," the grades are sufficient to produce satisfactory self-cleansing velocities. In this section the land is very flat and it will be necessary to fill some of the streets to obtain cover for the pipes. There are several houses along these streets and the fill will obviously

put the adjacent property owners to considerable expense. In order to keep the expense as low as possible it is proposed to use 10-inch pipe laid on a minimum grade of .25 per cent and to provide a flush tank at the end of each line. This minimum grade of .25 per cent is a little lower than is desirable, but with the ample flushing facilities provided there seems to be no reason why the sewers can not be kept in satisfactory condition. On the plans a manhole instead of a flush tank is indicated at the west end of Sunset avenue. This is probably a mistake and should be corrected.

With one exception there is no change of grade nor alignment between manholes. On Protection avenue between Moore and Eureka avenues there is apparently a bend of several degrees about 100 feet above the manhole at Eureka avenue. In view of the fact that this bend will make it impossible to look through or rod the sewer it would seem advisable to provide a manhole at the bend particularly as the distance between the manholes as shown, is approximately 700 feet. In general the distance between the manholes is about 500 feet. In one case, however, on Central avenue the distance is 695 feet and an additional manhole should be provided, located in the center of the block as is done on the lines of the adjacent streets which are of the same length. On Weber street, Goodel avenue and the north end of Gray street the upper extremities of the sewers are apparently left with dead ends. This is not in accordance with good practice and lampholes or manholes should be provided at these points.

At the junction of John and King streets there is apparently some mistake in the elevation of the sewer invert which should be corrected.

Although as mentioned above, the village of Herkimer was notified on July 25, 1913, to construct works for the preliminary treatment of the entire sanitary sewage of the village and to have such works completed and in operation by August 1, 1914, no plant has been constructed and no steps have been taken toward the installation of such a plant. The construction of the proposed sewer extensions will tend to increase the pollution of the Mohawk river and as is pointed out in the previous reports on the examination of the plans for sewage of villages along this river, no additional sewage should be discharged into it without treatment and steps should be taken as rapidly as possible to remove the pollution that now enters the river. It seems desirable, therefore, that the village of Herkimer should be required to proceed with the construction of the disposal works at an early date.

I would, therefore, recommend that the plans for the extensions of the sewerage system of the village of Herkimer submitted September 17, 1917, be approved and a permit be issued for the discharge of sewage from the proposed extensions into the Mohawk river with the following conditions:

1. That a flush tank be provided at the west end of Sunset avenue.
2. That an extra manhole be provided at Central avenue, located near the middle of the block.
3. That manholes or lampholes be provided at the upper ends of the sewers at Weber street, Goodel avenue and at the north end of Gray street.
4. That a manhole be provided at the bend on Protection avenue between Moore and Eureka avenues.
5. That the elevation of the invert at the corner of John and King streets be corrected.
6. That when required by the State Commissioner of Health a sewage disposal works be constructed and put in operation.

I further recommend that, owing to present conditions, the time for constructing the preliminary sewage treatment works be extended from August 1, 1914, to such time as you may deem it advisable to designate.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 26, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Municipal Commission of the village of Herkimer to discharge sewage from the proposed sewers in Main, East German and other streets into the waters of the Mohawk river through the existing outlet sewer below the South Washington Street bridge within the municipality of Herkimer in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That a flush tank be provided at the west end of Sunset avenue.
5. That an extra manhole be provided at Central avenue, near the middle of the block.
6. That manholes or lampholes be provided at the upper ends of sewers in Weber street, Goodel avenue and at the north end of Gray street.
7. That a manhole be provided at the bend on Protection avenue, between Moore and Eureka avenues.
8. That after November 1, 1920, sewage from the proposed sewers shall not be discharged without treatment into the Mohawk river, but shall be conveyed to and treated in the sewage disposal works for the village of Herkimer to be constructed in accordance with the notice issued by this Department to the Municipal Commission of the village of Herkimer on October 31, 1917.

M. NICOLL, JR.,
Deputy State Commissioner of Health

October 31, 1917

In the Matter of the Application of the Village of Herkimer for the Extension of the Time for Constructing Sewage Disposal Works to Treat the Sewage of the Village as Required by the State Department of Health.

In response to the application of the Municipal Commission of the village of Herkimer transmitted by E. W. Sluyter, clerk of the Municipal Commission under date of October 12, 1917, asking for an extension of the time for the construction of the sewage disposal works to treat the sewage of the village shown by the plans approved by this Department on July 25, 1913, which sewage disposal works were required to be completed and put in operation by August 1, 1914, under the terms of the notice issued to the Municipal Commission of the village of Herkimer by this Department on July 25, 1913, in accordance with section 77 of chapter 45 of the Consolidated Laws (Public Health Law); and after careful consideration of the facts and reasons presented in said application the time within which such disposal works shall be constructed and put in operation is hereby extended from August 1, 1914, to November 1, 1920.

This extension of time is granted in accordance with and under the provisions of section 77 of chapter 45 of the Consolidated Laws (Public Health Law) on this 31st day of October, 1917.

M. NICOLL, JR.,
Deputy State Commissioner of Health

Albany, N. Y.

HUNTER (Mansfield Ferry)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewage disposal for the property of Mr. Mansfield Ferry at Onteora Park, Tannersville, N. Y., submitted to this Department for approval on September 17 and September 24, 1917.

According to the reports of the designing engineers, Mr. Ferry's property is situated in Onteora Park, about two miles north of Tannersville, Greene county, N. Y. There are two separate disposal plants on the property: one plant treats the sewage from the main residence. This plant was constructed and has been in continuous operation since 1909. The other disposal plant treats the sewage from the lodge and garage and was constructed and has been in continuous use since 1915.

Main residence

The main residence contains 20 living and sleeping rooms in addition to 5 bath rooms, a laundry having 3 tubs, and 2 kitchen sinks. The average population is placed at 8 persons with a maximum of 15 persons. The average daily flow of sewage is estimated at 800 gallons and the maximum daily flow of sewage 1,500 gallons.

Sewage disposal

The sewage from the main residence is treated in a sewage disposal plant consisting of a settling tank, dosing tank, and a subsurface irrigation system divided into two sections.

Settling tank

The sewage from the residence is conveyed to the settling tank through a 5-inch vitrified pipe laid on a slope of about 4 per cent. This tank, which is rectangular in plan, is 8 feet long, 4 feet wide and has a depth of 5 feet below the flow line, giving a capacity of about 1,200 gallons, equal to about 1½ days' flow of sewage on the basis of design used. The minimum detention period of the sewage would be about 19 hours. The tank has a reinforced concrete cover with a manhole opening. A baffle is also placed in the settling tank, 2 feet from the overflow into the dosing chamber.

Dosing tank

The sewage from the settling tank flows over a concrete partition into a dosing tank having a capacity of 56 cubic feet. This tank is connected with a 3-inch Wagner siphon by means of which the sewage is discharged intermittently through a 5-inch pipe laid on a slope of about 1.5 per cent to the diverting gate of the subsurface disposal field. The dosing tank is under the same cover as the settling tank and also has a manhole opening.

Subsurface disposal field

The subsurface disposal field is located about 150 feet from the settling tank and dosing chamber. The distributing system consists of lines of 5-inch horseshoe tile laid on 3 by 6 inch hollow terra cotta base blocks with open joints on a slope of 0.20 per cent. The tiling is laid at a depth of about 18 inches below the ground surface and is surrounded by clean gravel. The disposal field is divided into two units each containing 962 lineal feet of tiling equal to from 125 to 240 feet of tile per person served.

Lodge and garage

The lodge is the gardeners' dwelling and the second floor of the garage is the dwelling for the chauffeur and his family. Each building is equipped with a bath tub, wash basin, water closet fixtures, and kitchen sink. The garage proper also has a sink, but the floor washings in the garage can in no way reach the disposal plant. It is stated that the occupants of the lodge and garage number about 6 persons. The maximum daily flow is estimated by the designing engineers at 400 gallons allowing 50 gallons per person per day and 100 gallons daily from the garage sink.

Sewage disposal

The sewage from the lodge and garage is treated in a sewage disposal plant consisting of a settling tank, dosing tank, and intermittent sand filters. The effluent from the sand filters is discharged into 2 large absorption pits filled with loose stones.

Settling tank

The sewage from the lodge and garage is conveyed to the settling tank through 4 inch vitrified pipe laid on a slope of about 2 per cent. This tank which is rectangular in plan is 5 feet long, 4 feet, 3 inches wide and has a depth of 5 feet below the flow line giving a capacity of about 800 gallons equal to about two days' flow of sewage on the basis of design used. On the usual basis of 100 gallons per capita per day the sewage would have a detention period of about 1⅓ days in the tank. The tank has a 5-inch reinforced concrete cover with a manhole opening. It has a baffle 15 inches from the inlet and a baffle 6 inches from the outlet into the dosing tank.

Dosing tank

The sewage from the settling tank flows over a concrete partition into a dosing tank having a capacity of about 40 cubic feet. This tank is connected with 2 standard 5-inch Miller siphons which are so arranged as to discharge alternately. The dosing tank is under the same cover as the settling tank and is provided with a manhole opening.

Sand filters

Each siphon in the dosing tank is independently connected to a sand filter by a 4-inch cast iron soil pipe with lead joints laid on a slope of 4.0 per cent. Each sand filter is 8.5 feet square giving a total area of 144 square feet and a net area of about 132 square feet. The filters are covered with a mosquito proof copper screen during the summer and in the winter by a wooden covering. There is a space of 18 inches between the wooden covering and the surface of the sand filters. It is stated by the designing engineers that the filtering material consists of 3 feet of coarse sand underlaid by graded gravel. The filter effluent is collected by 2 rows of split pipe underdrain in each unit of the sand filters.

As noted above the combined area of the sand filters as designed is 132 square feet equal to about 0.003 acres. Based on a daily flow of sewage of 400 gallons the filters are required to operate at a rate of 133,000 gallons per acre per day. Based, however, upon a per capita rate of water consumption of 100 gallons per day which is the usual basis of design used the filters are required to operate at a rate of 200,000 gallons per acre per day. This rate of operation is excessive for intermittent sand filters which should not be required to operate over 100,000 gallons per acre per day based on a per capita rate of sewage contribution of 100 gallons per day. This would therefore require doubling the area of each unit of the sand filter. The dosing tank as stated above has a capacity of 40 cubic feet, sufficient to cover one unit of the sand filter, when the area is doubled, to a depth of about 4 inches with sewage.

Effluent disposal

The filter effluent is collected by 2 rows of split pipe underdrain in each unit of the sand filter and is conducted to a separate absorption pit for each filter unit. Each pit is 7 feet in diameter and 7 feet deep, filled with field stone topped with soil. It is stated by the designing engineers that there is no suitable field for subsurface irrigation nor any adjacent watercourse into which the effluent might be discharged, hence the necessity for the absorption pits.

Sludge disposal

It is stated that the sludge from the settling tanks caring for the sewage from the main residence and also the lodge and garage is regularly removed once each year and is buried.

Conclusions and recommendations

From our careful examination of the plans it is found that, although the sewage disposal plants have been designed in general to meet the local requirements for sewage disposal, there is one modification as noted above which should be made in the construction of the plant in order not only to increase its efficiency but also to reduce the work and cost of maintenance.

I therefore recommend that the plans be approved on the condition that the area of the sand filter be increased fifty per cent.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *September* 28, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to Mr. Mansfield Ferry to discharge effluent from the proposed sewage disposal works for his property near Tannersville into the waters of the State tributary to Schoharie creek and its tributaries within the town of Hunter in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That the proposed sewage disposal works shall be constructed in complete conformity with the plans or approved amendments thereof except as provided in condition 5 of this permit.
4. That only sanitary or domestic sewage and no surface or storm water from grounds, roofs or other areas shall be discharged into the proposed sewage disposal plant.
5. That the area of the sand filter shall be increased 50 per cent over that shown by the approved plans.

M. NICOLL, JR.,

Deputy State Commissioner of Health

November 27, 1917

IRVINGTON

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on our examination of plans for a proposed sewer in the village of Irvington, Westchester county, submitted to this Department for approval on March 5, 1917. An application for the approval of the plans was received March 12, 1917.

The records of the Department show that original plans for a comprehensive sewer system covering practically all developed portions of the village of Irvington were approved by the then State Board of Health on October 14, 1891. These plans provided for the 6-inch sewer in Broadway south of Clinton avenue. According to the application recently submitted by the board of trustees this has not been constructed.

The plans now submitted provide for an 8-inch sewer in this portion of Broadway extending from a point 275 feet south of Clinton avenue to Hudson avenue, a distance of about 2,700 feet in place of the 6-inch sewer shown by the approved plans. The proposed sewer is to be constructed with a slope of from .7 to 2.6 per cent and is to be provided with a flush tank at the upper end. Manholes are to be installed at all points of change of slope and alignment and at intermediate points not exceeding 300 feet apart.

From our careful examination of plans it appears that the design of the proposed sewer is satisfactory with respect to slopes and capacity and provision for cleaning and inspection, and that if properly constructed the sewer should satisfactorily meet the requirements for which it was designed.

I would, therefore, recommend that the plans be approved. It should not be necessary, however, to issue a permit in connection with the approval of these plans inasmuch as they provide simply for modifications of the proposed sewer in this portion of Broadway and do not provide for the discharge into the Hudson river of any additional sewage not contemplated by the original plan.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 14, 1917

The plans were approved March 14, 1917.

ITHACA (New York State Veterinary College)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of amended plans for sewage disposal for the new cattle barn at the New York State Veterinary College, Cornell University, submitted to this Department for approval by the State Architect in accordance with the provisions of section 14 of the Public Health Law, on May 3, 1917.

Original plans for water supply and sewage disposal for this building were approved by this Department on August 16, 1916. These plans provided for a water supply to be derived from a cased 6-inch driven well approximately 100 feet deep and for a sewage disposal plant consisting of a watertight cesspool and subsurface irrigation system to care for the sewage from one sink, one lavatory, one water closet and one bath tub. On February 6, and again on March 23, 1917, plans providing for a number of modifications and changes in the original plans were submitted for approval. According to data submitted with them, the proposed changes were necessary because the bids received by the University exceeded the amount of money available for construction. The plans as presented, however, were not in satisfactory condition for approval and were, therefore, returned to the State Architect for modification.

According to the plans and data now submitted, it is proposed to omit the installation of the water closet, lavatory and bath tub at the barn and the water-tight cesspool and subsurface irrigation system, and to install a privy with tight removable containers and also a sink, the wastes from which are to be disposed of in a leaching cesspool to be located north of the building. The subsurface drains and floor drains of the building are to be discharged into the highway gutter about 115 feet from the building as originally planned.

The proposed cesspool is to be 5 feet in diameter and 6 feet deep below the flow line, and if properly constructed, should satisfactorily care for the limited amount of wastes from the sink. Additional cesspools or a subsurface irrigation system could, however, be constructed in the future if necessary. If any objectionable conditions are created by the discharge of the floor drains and subsurface drains into the highway gutter, cesspools could be constructed to care for these wastes.

In view of the above, I would recommend that the plans be approved.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 4, 1917.

The plans were approved May 9, 1917.

KENMORE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for the proposed reconstruction of the sanitary sewers in the lower part of Delaware avenue in the village of Kenmore, Erie county, submitted to this Department for approval on September 15, 1917.

The records of the Department show that original plans for a sewer system in the village submitted by the board of trustees, were approved by this Department on April 3, 1907. These plans provided for an 18-inch sewer on each side of Delaware avenue between Delaware road and the village line at Kenmore avenue. These sewers discharge into two 24-inch sewers tributary to the Hertel avenue sewer in the city of Buffalo.

According to the report submitted with the present plans the greater portion of the 2 18-inch sewers in Delaware avenue below Delaware road, which have been constructed under cement sidewalks in the village have collapsed and the reconstruction of them would require the tearing up of these sidewalks.

It is proposed, therefore, to replace these sewers by a new 24-inch sewer laid on a slope of .2 per cent under the pavement near the middle of Delaware avenue and to connect the lateral sewers tributary to the Delaware avenue sewers with the new sewer at each stret intersection. The flow of the proposed sewer will be divided at Kenmore avenue and will discharge into the two 24-inch city sewers through two short lengths of 18-inch sewers.

It is stated by the report of the engineers that the storm water catch basins which were formerly connected with the two existing Delaware avenue sewers have been disconnected and the storm water is now cared for in the storm water sewer recently constructed in this section.

From our careful examination of the plans it would appear that they are satisfactory and meet the requirements of this Department.

I would, therefore, recommend that the plans be approved. It should not be necessary, however, to issue a permit in this case inasmuch as the plans do not provide for any additional discharge of sewage over that contemplated by the existing sewers.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 15, 1917

The plans were approved September 15, 1917.

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of the plans for a comprehensive sewerage system for the village of Kenmore, Erie county, N. Y., submitted to this Department for approval by the trustees of the village on October 6, 1917.

Plans for certain proposed sewers in the village of Kenmore tributary to the Buffalo sewerage system were approved by this Department on April 3, 1907 and October 24, 1913. In 1914 plans for a comprehensive sewerage system for the village and for works for preliminary treatment of sewage were submitted to this Department for approval. According to these plans the sewage was to be screened and the effluent from the screening chamber discharged into the Niagara river in the city of Tonawanda. These plans were approved on December 30, 1914, on condition that plans for supplementary treatment works be submitted to this Department for approval whenever required by the State Commissioner of Health.

Most of the sewers for which plans were approved in 1907 and part of those for which plans were approved in 1913 and 1914 have been constructed but none of the trunks leading to the proposed treatment plant have been built. All of the sewage from the village is now being discharged to the Hertel avenue sewer in the city of Buffalo. Plans for the reconstruction of the Delaware avenue sewer in the village were approved on September 15, 1917.

The present plans contemplate the incorporation of the existing sewers in the new system, and in a large part of the village the new sewers follow the lines and grades of the sewers as shown on the plans approved on December 30, 1914. The trunk lines of the western portion of the village, however, have been redesigned to conduct the flow to the Buffalo sewers instead of to the proposed treatment works. It is intended to connect the proposed system for the village of Kenmore to the Buffalo sewers at three points, the first being at the south end of Delaware avenue; the second at the south end of Elmwood street; and the third at the south end of Military avenue. The contract for the first of these connections, which is practically a reconstruction of the present connection, has already been let, and the engineer states that it is intended to let the contract for the second connection and the trunks leading to it as soon as the present plans are approved. In regard to the third connection, there seems to be some doubt as to whether or not the capacity of the Buffalo sewer into which the sewage coming to this connection will be discharged, is great enough to take the flow; and it may be necessary to reconstruct a portion of the sewer line in the city before the connection is made.

The proposed sewers are to be from 8 to 24 inches in diameter, and while the topography of the ground requires the use of flat grades the lines will have ample capacity to serve the needs of the different sections of the village for a reasonable future period and sufficiently steep grades to give self-cleansing velocities if the pipes are properly laid. The grades of some of the existing sewers are marked "unknown," but no complaint has been made that any of these sewers have not been operating satisfactorily.

Manholes are provided at all intersections, and at intervals of about 500 feet on all the proposed lines. There is no break in gradient or alignment between manholes on the proposed sewers. Some of the existing sewers, however, are not provided with a sufficient number of manholes and manholes should be constructed on these lines at all intersections and ends and at such intermediate points as may be necessary so that in no case the distance between them will be over 500 feet.

In view of the results of our examination of these plans and after a careful consideration of the essential features of the design and local and general requirements, I beg to recommend that these plans be approved and a permit issued for the discharge of the sewage from the system into the Niagara river through the outlet of the Hertel avenue sewer of the city of Buffalo on the following condition:

> That whenever required by the State Commissioner of Health detailed plans satisfactory to the Department for the preliminary or complete

treatment of the sewage of the village, either separately or in connection with that of the city of Buffalo, shall be submitted for approval and that after the approval of such plans any or all portions of such disposal works shall be constructed and put in operation at such time or times as the State Commissioner may designate.

Yours very truly,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 10, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Trustees of the village of Kenmore to discharge sewage from the sewer system of the village through the sewer system of the city of Buffalo subject to agreement with said city into the waters of Niagara river through the Hertel avenue sewer within the municipality of Buffalo in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That whenever it is deemed necessary by the State Commissioner of Health owing to lack of capacity of the sewer system of the city of Buffalo, or for other reasons, separate provisions shall be made for the collection and disposal of the sewage collected by the sewer system of the village of Kenmore, satisfactory plans for which shall be submitted to the State Commissioner of Health for approval; and after approval the works shown by said plans shall be constructed and put in operation when required by the State Commissioner of Health.

M. NICOLL, JR.,
Deputy State Commissioner of Health

October 15, 1917

KINGS PARK (State Hospital)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for extensions and additions to the sewage disposal plant at the Kings Park State Hospital, submitted to this Department for approval by the State Architect on July 2, 1917.

Original plans for a sewage disposal plant consisting of a screen chamber, 2 settling tanks of the Dortmund type, a dosing chamber, a sprinkling filter, final settling tank and a sludge drying bed were approved on December 29, 1908. On June 28, 1912, plans for converting the Dortmund tanks into Imhoff tanks and for completing the sprinkling filter were approved. The disposal plant was originally designed to care for a population of 5,000 and a per capita rate of sewage contribution of 100 gallons per day.

Inspections of the disposal plant of this institution made by representatives of this Department this year showed that the population tributary to the disposal plant had already exceeded 5,000 persons and that the per capita rate of sewage contribution is over 120 gallons per day, an excess of about 20 per cent of the original estimate on which the design was based, so that portions of the plant were overtaxed. We were also advised by representatives of the institution that it was contemplated to increase the population by about 1,000 in the near future. It was, therefore, strongly recommended that provisions be made for enlarging portions of the plant and for providing for the sterilization of the effluent.

The plans now submitted show that it is proposed to increase the settling capacity of the disposal plant by the construction of an additional settling tank; to increase the size of the sprinkling filter and to install a new chlorination plant. The proposed settling tank will have a capacity equal to the capacity of one of the existing tanks, thereby increasing the settling capacity of the plant 50 per cent. The combined settling capacity of the tanks will be equal to approximately 55,500 gallons and will give a detention period of about 2.2 hours under present conditions and a detention period of approximately 1¾ hours for ultimate conditions, assuming a future population of 6,000 and a per capita rate of sewage contribution of 120 gallons.

The sprinkling filter is to be increased in size 33⅓ per cent and will have an area when enlarged of .33 acres. It will, therefore, provide for an average rate of operation of 1,800,000 gallons per acre per day when serving a population of 6,000 on the basis of a per capita flow of 100 gallons per day. The depth of the new portion of the filter and the arrangement of the distributing and collecting system is to be the same as the present filter.

The chlorination plant provided for by the plans is to be equipped with a chlorine apparatus of the manually operated direct feed type. The chlorine is to be applied to the sprinkling filter effluent as it enters the final settling tank. Although the specifications specify the amount of chlorine that the chlorine device shall be capable of applying per hour, no statement is made as to the amount of chlorine to be used. Not less than 5 parts of chlorine gas per million parts of sewage treated should be applied uniformly to the sprinkling filter effluent at all times.

The plans also provide for removing a section of the by-pass around the final settling tank. This will necessitate the operation of the final settling tank at all times. It was found on previous inspections by this Department that the final settling tank was not in operation and that no provisions were made for the disposal of sludge from this tank. The final settling tank should be cleaned and placed in operation and a sludge bed should be provided to care for the sludge from this tank. The plans, however, do not provide for a sludge bed to care for the sludge from the final settling tank and it is not planned to install a sludge bed under the present contract. It is understood, however, that the construction of such sludge bed will be arranged for by the institution authorities.

In conclusion, I would state that it is found from our careful examination of the plans that the proposed modifications and additions, if properly carried out, should satisfactorily care for the sewage from a population as high as 6,000 persons, and that the plant if maintained with care and efficiency should produce an effluent that may safely be discharged into the Nissaquogue river without objection.

I would, therefore, recommend that the plans be approved on the conditions that not less than 5 parts of chlorine per million parts of sewage treated shall be applied uniformly to the effluent from the sprinkling filter at all times.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July* 3, 1917

The plans were approved July 3, 1917.

LARCHMONT

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on our examination of plans for the interception and disposal of the sewage of the village of Larchmont, Westchester county, recently submitted to this Department for approval by the board of trustees.

Plans for the disposal of sewage for the more developed portions of the village were first submitted for approval on October 1, 1915, in compliance with the conditions of a permit previously issued to the village in connection with the approval of plans for the discharge of sewage from proposed sewers. This permit required in general that plans for the interception and disposal of the entire sanitary sewage should be submitted to this Department for approval within a certain specified time. The plans first submitted, however, did not include plans for the interception and treatment of the sewage from the whole village although the report of the consulting engineers who prepared the plans for the disposal works outlined in a general way a proposed method of intercepting and disposing of the entire sewage of the village. The village authorities were, therefore, advised that the requirements of the permit referred to had not been fully complied with inasmuch as no plans had been submitted showing the proposed method of caring for the sewage of the entire village. After a number of conferences and considerable correspondence with representatives of the village a general plan showing the location of existing sewers and a general scheme for the collection, interception and disposal of the entire sewage of the village was submitted on January 11, 1917.

According to these plans and the engineering reports submitted with them, the village is divided by a ridge which runs in a northerly and southerly direction through the village. The general slope of the ground is toward Larchmont harbor on the east, toward Pine brook and Premium creek on the west and toward Long Island sound on the south. The topography and conditions of the village appear to be such that it is not practicable to collect and convey the sewage of the entire village to one suitable point for disposal by gravity flow. A general plan submitted shows the area of the village divided into 7 drainage areas, designated as districts Nos. 1, 2, 3, 4, 5A, 5B and 5C.

District no. 1

This district comprises a fairly large area in the northeastern section of the village east of Larchmont avenue and north of Cherry street. This area is at present provided with a separate sewer system which discharges into Larchmont harbor through a 20-inch sewer at a point about 700 feet from shore, where the water is about 3.5 feet deep at low tide. According to the report of the consulting engineers the tide backs up in this outfall sewer as far as Cherry avenue, and possibly as far as Larchmont avenue, at times of extreme high tide. This outfall sewer also receives the sewage from a portion of Larchmont park in district No. 5A, which sewage is pumped from a small pumping station located near the lower end of Lincoln avenue.

It is proposed to treat the sewage from district No. 1 and probably from district No. 5A in a sewage disposal plant consisting of an Imhoff tank to be located along the line of the outfall sewer in Bonnet avenue, about 700 feet north of Cherry creek. In order to make the sewage from the portion of district No. 1 in Cherry street and south of Cherry street, as well as from district No. 5A tributary to this disposal plant, it will be necessary to reconstruct the sewer in Monroe avenue, Cherry avenue and a portion of Bonnet avenue. The location and alignment of the proposed sewers in these streets are shown in general by the plans. Detailed plans for these sewers should, however, be submitted before the disposal works are constructed.

District no. 2

This district is a small area situated south of District No. 1. The sewage from this district at present discharges into Larchmont Harbor through a ten-inch sewer at a point about 200 feet from shore. The report on the disposal of sewage of the village states that there are at present 30 connections with the sewers in this district and that although these sewers were originally built on the separate plan storm water connections have been made with them. It is proposed to treat the sewage from this district in a small screen chamber to be located near the foot of Woodbine avenue.

District no. 3

This district comprises a relatively small area in the southern part of the village west of District No. 2. The sewage from District No. 3 is at present discharged into Larchmont Harbor through a 10-inch sewer at a point about 200 feet from the shore. There are about 80 connections to the sewer system in this district which includes a number of summer hotels so that there is considerable fluctuation in the number of people served by this system. It is proposed to treat the sewage from this district as well as from District No. 4 located west of District No. 3, in a sewage disposal plant consisting of an Imhoff tank designated on the plans as the Village Park Plant.

District no. 4

This district as noted above is situated west of District No. 3 and extends from Willow avenue, on the north to Long Island Sound on the south. The sewage from this district discharges into Long Island Sound at a point about 200 feet from the shore west of Horseshoe Harbor. There are about 75 connections to the sewer system in this district. According to the plans and report of the consulting engineers the greater portion of the sewage from this district is to be intercepted by a sewer in Park avenue, extending from Grove street, to Circle avenue, a distance of about 950 feet. The details of this sewer are not shown, however.

District no. 5a

This district comprises a comparatively large area in the northwestern part of the village extending both north and south of the Boston Post road and east and west of Pine brook. Although this district is sparsely populated at present it is estimated by the consulting engineers that the ultimate population tributary to the sewers in this area will probably exceed 5,000.

The sewage from the so-called Larchmont Park section of this district is at present conveyed to a small pumping station located near the lower end of Larchmont avenue, from which the sewage is pumped over the ridge into District No. 1. This pumping station consists of a covered concrete collecting well and a covered pump chamber and is equipped with a small centrifugal pump, belt driven from a hand operated electric motor. Although the report of the consulting engineers proposes two alternate schemes for the collection of the sewage in District 5A involving the remodeling of the existing pumping station and the construction of one or two additional pumping stations, it is recommended that the existing pumping station be abandoned inasmuch as it is obsolete and inadequate and would have to be entirely reconstructed to make it efficient and that a 15-inch intercepting sewer be constructed from a point near the pumping station extending southerly to a proposed pumping station to be located near the lower end of Oak avenue, to care for the sewage from the northerly portion of District No. 5A east of Pine brook. The location of the proposed sewer is shown by the general plans. The plans also provide for a 10-inch sewer extending

northerly from Helena avenue, to the proposed pumping station near Oak avenue, to care for the southerly portion of this district. A sewer in Boston Post road and in Oak avenue, connecting with the proposed pumping station near Oak avenue, is also proposed to care for the sewage of District No. 5A north and west of Pine brook. Details of these sewers are not shown, however, nor are there any details shown of the pumping station.

The report of the consulting engineers recommended, however, that the proposed pumping station be equipped with two centrifugal pumps driven by automatically operated electric motors and that an auxiliary gas engine to be used in case of emergency be provided. It is proposed according to the report and plans to pump the sewage from the pumping station through a force main laid through private property and in Willow avenue, to Prospect avenue, from which point the sewage will flow by gravity to the Bonnet avenue sewage disposal works. The report of the consulting engineers also recommends that whenever the cost of pumping the sewage becomes greater than the cost of operation of the pumping station plus the interest on the cost of construction of a sewage disposal plant for this section that a disposal plant consisting of settling tanks, sprinkling filters and final settling tanks be constructed in the low area near the Oak avenue pumping station in which case this pumping station would be used to lift the sewage into the proposed disposal plant.

District no. 5b

This district consists of a very small area on either side of the northerly portion of Pryer Lane. The plans show that it is proposed to care for this sewage in the future by the construction of a sewer in Helena avenue, and Pryer lane tributary to the existing sewers in District No. 4. The plans do not show details of the proposed sewer.

District no. 5c

This district comprises a small area located in the southwestern corner of the village. The plans provide for the future treatment of the sewage from this district in a small screen plant from which the effluent will be discharged into Long Island Sound. No details of the sewer and screen chamber are shown.

Bonnet avenue sewage disposal plant

The proposed sewage disposal plant in Bonnet avenue which is to serve District No. 1 and District 5A is to consist of a covered settling tank 24 feet in diameter, 32½ feet deep with a maximum depth between the flow line of 22¼ feet. It is planned to locate this tank under the street in Bonnet avenue. It is designed to care for a population of 2,000. The plans also provide for an additional tank having the same capacity to be located under the street of Bonnet avenue, adjacent to the proposed tank.

The proposed settling tank has a settling capacity of about 19,000 gallons and will, therefore, provide for a detention period of about 2¼ hours when serving a population of 2,000 assuming a per capita rate of sewage contribution of 100 gallons a day. The sludge compartment has a capacity of about 2,800 cubic feet equal to about 1¼ cubic feet per person served.

Although the proposed settling tank if properly constructed and properly maintained should provide for a satisfactory preliminary treatment of the sewage there are certain features which should be modified. In the first place the tank should not be located in the street. It would appear that this could be obviated by changing slightly the location of Bonnet avenue, opposite the disposal plant. I am also of the opinion that there would be danger of explosion from gases generated in the tank if covered as proposed unless proper means be taken to ventilate the tank by forced draught. It would appear that if for any reason this cannot be done the concrete cover should be omitted and the tank covered by a small building.

Village park plant

This plant which is to care for the sewage from Districts Nos. 3, 4 and 5B is similar to the Bonnet avenue plant and is designed to serve a population of 2,000. As in the case of the Bonnet avenue plant provision should be made for properly ventilating the tank by forced draught or for leaving it open and covering it with a small building.

Woodbine avenue plant

The plant consists of a screen chamber, 6 feet long, 3½ feet wide by 6 feet deep inside dimensions. The screen chamber is to be provided with an inclined bar screen composed of 2-inch by ⅜-inch bars placed 1 inch apart in the clear. The screen chamber is to be located near Larchmont Harbor on the line of the existing outfall sewer and the screened effluent is to be discharged into the Harbor through the present outlet.

Conclusions and recommendations

From our careful examination of the plans, it is found that provisions have been made for the preliminary treatment of the sewage from the more thickly developed portions of the village and for the future collection and interception and treatment of the entire sanitary sewage of the village. Although the disposal plants to be constructed at first are shown in detail the scheme for the future collection and interception of the sewage in the more sparsely settled section of the village is shown only in general by the plans and it is, therefore, impracticable to finally pass upon the adequacy of the proposed intercepting sewers before detailed plans are submitted. Before the proposed disposal works are constructed the detailed plans for intercepting sewers and pumping station shown in general by the present plans should, therefore, be submitted.

It appears also that although the preliminary treatment provided for by the plans should produce an effluent that might be discharged into Larchmont Harbor and Long Island Sound without objection at present it might be necessary at some time in the future when the village becomes more fully developed to provide for a more complete treatment of the sewage than that contemplated by the present plans and consideration should, therefore, be given by the village authorities to the possible necessity in the future of intercepting the effluent from the proposed sewage disposal plants and conveying it to a suitable site for more complete treatment.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge of effluent from the proposed sewage disposal plants into Larchmont Harbor and Long Island Sound and that the permit contain in addition to the usual revocation and modification clauses the following conditions:

1. That the Bonnet avenue works be located outside of the street or that the location of the portion of the street near the plant be changed and that plans for such modifications be submitted before this disposal plant is constructed.
2. That before the Bonnet avenue plant is constructed plans for the sewers in Willow avenue, Monroe avenue, Cherry avenue and Bonnet avenue, so designed as to permit of conveying the sewage from District 5A and from the Cherry avenue section to the Bonnet avenue disposal plant be submitted for approval.
3. That before the Village Park Plant is constructed detailed plans for the intercepting sewer in Park avenue, for the interception of the sewage in District No. 4 be submitted for approval.
4. That provisions be made for ventilating the proposed Imhoff tanks by forced draft or that the concrete covers be omitted and the tanks covered with suitably ventilated buildings and that plans for such changes be submitted for approval before the tanks are constructed.

5. That whenever required detailed plans for the intercepting sewers and for the proposed pumping station in District 5A be submitted for approval.

6. That detailed plans of the proposed sewer and screen chamber in District 5C be submitted before the construction of the sewer and screen chamber.

7. That whenever required, plans for the interception and more complete treatment of the effluent from the proposed sewage disposal plants at a suitable point be submitted to this Department for approval.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *February* 14, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Trustees of the village of Larchmont to discharge effluent from the proposed sewage disposal plants into the waters of Larchmont Harbor and Long Island Sound at the points indicated by the plans within the municipality of Larchmont in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That both the sewer system and sewage disposal works shown by the plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof as herein provided.

4. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers or sewage disposal works.

5. That no sewage sludge from any part of the disposal works shall be discharged into Larchmont Harbor, Long Island Sound or any other watercourse or body of water.

6. That the Bonnet avenue works shall not be built within the street lines or that the location of the portion of the street near the plant be changed; and that plans for such modifications shall be submitted before such works are constructed.

7. That, before the Bonnet avenue works are constructed plans for sewers in Willow avenue, Monroe avenue, Cherry avenue and Bonnet avenue, so designed as to permit of conveying the sewage from District 5A and from the Cherry avenue section to such works, shall be submitted for approval.

8. That before the village park works are constructed detailed plans for an intercepting sewer in Park avenue to intercept the sewage in District No. 4 shall be submitted for approval.

9. That provision shall be made for ventilating the proposed Imhoff tanks by forced draft or that the concrete covers shall be omitted and the tanks covered with suitable ventilated buildings; and that before these tanks are constructed detailed plans for such changes shall be submitted for approval.

10. That whenever required by the State Commissioner of Health detailed plans for the intercepting sewers and for the proposed pumping station in District 5A shall be submitted for approval.

11. That detailed plans of the proposed sewer and screen chamber in District 5C shall be submitted for approval before the construction of this sewer and screen chamber.

12. That whenever required detailed plans for the interception and more complete treatment at a suitable point of the effluent from the several proposed sewage disposal plants shall be submitted to this Department for approval; and any or all portions of such works shall be constructed and put in operation at such time or times thereafter as said Commissioner may designate.

LINSLY R. WILLIAMS,
Acting State Commissioner of Health

March 2, 1917

HERMANN M. BIGGS M. D., *State Commissioner of Health:*

I beg to submit the following report on our examination of the plans for a proposed sewage pumping station and of certain intercepting sewers for the village of Larchmont, Westchester county, submitted to this Department for approval by the trustees of the village on September 26, 1917.

The records of the Department show that plans for sewage disposal for the entire village were approved on March 2, 1917, on the condition that whenever required by the State Commission of Health detailed plans for the intercepting sewers and for the proposed pumping station in District 5-A should be submitted for approval. It is in compliance with this condition that the present plans have been submitted.

The section that will be served by the intercepting sewer and pumping station is designated on the map showing the location of the sewers of the village as District 5-A and comprises an area of a little over 200 acres in the northwestern corner of the village. The sewage from a part of this district known as the Larchmont Park section is at present conveyed to a small pumping station located near the lower end of Lincoln Street from which it is pumped over the ridge into sewers of District No. 1. Several complaints have been received by this Department in reference to the insanitary conditions caused by the failure of the owners of this pumping station to keep it operating satisfactorily. It appears from the report of the consulting engineer that the plant is of obsolete design and entirely inadequate to serve the needs of the district tributary to it.

The proposed pumping station is to be constructed at the foot of Oak avenue near Premium creek, a location to which all the sewage from District 5-A can readily be drained by gravity. The plant consists of a screen chamber, suction well, overflow well, and a pump-room housing two horizontal centrifugal pumps arranged to be driven either by electric motors or a gas engine. The building is approximately 25 feet by 30 feet, and extends 26 feet below the surface of the ground. The portion below ground level is of reinforced concrete, and the superstructure, one story high, is of brick. The flow line of the inlet sewer is 2½ feet below mean tide and 9½ feet below the surface of the ground. A gas heater is provided in the building to keep the interior above freezing temperature in cold weather.

The sewage, on reaching the station, first passes through an inclined bar screen approximately 5 feet square of 2½ by ¾ inch bars set ¾ of an inch apart and then flows into a suction well from which, under normal operating conditions, it is raised by one of the centrifugal pumps and discharged through a 10-inch force main along St. Clare avenue into the 12-inch sewer on Willow avenue.

Two pumps are provided, each capable alone of caring for the maximum flow that will probably be received at the station at any time for a reasonable future period. The pumps are of the horizontal shaft double suction

type, direct connected to 10 horsepower slip-ring motors and arranged so that in case of emergency either, but not both, may be operated by the 15 horsepower gas engine to which both pumps are connected by means of clutches and a silent chain drive. The capacity of each pump is to be 350 gallons per minute and the minimum size of the suction and discharge nozzles is to be 5 inches. Both suction and discharge pipes are increased to 8 inches immediately beyond the pump.

The specifications require that the pump casings shall be so designed that by the substitution of different impellers and the installation of larger (15 horsepower motors the pumps will deliver 600 gallons per minute. This provision makes it possible to easily increase the capacity of the plant so that it will serve the needs of any population that may reasonably be expected to live in the district when it is entirely built up assuming that the sewers in the district are properly constructed with tight joints to prevent the infiltration of ground water.

Automatic float operated switches are provided for starting and stopping the motors, arranged to start one of the pumps when the sewage in the pump well rises to a predetermined level and to stop it when it drops to another level. If one pump does not stop the rise of sewage in the well, the second pump will be automatically started. The pumps are set below the level of the flow line of the inlet sewer and will, therefore, start without priming. The engineer's report recommends that an alarm be connected with one of the floats with the bell in the attendant's house to notify him if the pumps fail to work and the sewage rises above a certain level. Should the motors or the pumps for any reason fail to operate, the sewage will overflow from the suction well into the overflow well which is a concrete chamber located below the floor of the pump room, having a capacity of 30,000 gallons or about 3 hours average flow. Stop-boards are provided below the screen so that should it become necessary the sewage can be by-passed around the suction well into the overflow chamber. Branch suctions, 4 inches in diameter, from the pumps extend into this overflow chamber by which it is possible to pump out its contents.

If the attendant fails to start the pumps in operation before the overflow chamber is filled the sewage will back up in the sewer and escape through a relief pipe into Premium creek. In view of the fact that the plans provide for a duplicate pumping plant and an overflow well of ample capacity to care for the flow while ordinary repairs are being made, the installation of this relief pipe seems unnecessary. Its installation is, moreover, undesirable because by putting up the stop-boards of the screen chamber the entire flow of sewage can be by-passed into the creek. It would seem advisable, therefore, to omit it.

At the foot of St. Clare avenue a 6-inch blow-off pipe is arranged so that the contents of the force main can be discharged into Premium creek. This blow-off pipe is open to the same objection that the relief pipe is. There seems to be no reason why the force main cannot be drained into the overflow well, and the piping should be re-arranged so that this can be done.

To collect the sewage from the present sewers, the plans provide for a 15-inch trunk sewer or intercepting sewer from the present pumping station at the foot of Lincoln street to the location of the new station at the foot of Oak street. The sewer is to be laid on a .25 per cent grade, and will have ample capacity to care for the sewage of the district. Manholes are provided at all changes in alignment and at intervals of about 300 feet on the straight runs. No detailed plans are provided for a trunk line to care for the southern end of District No. 5-A but a connection for a future 10-inch sewer is indicated at the inlet manhole at the pumping station.

In view of the results of our examination of these plans and after a careful consideration of the essential features of the design, I beg to recommend that the plans be approved on the following conditions:

1. That the relief pipe at the manhole first above the pumping station be omitted.

2. That the blow-off pipe shown on the force main at the foot of St. Clare avenue be omitted.

3. That a detailed plan of the intercepting sewer for the southern portion of District 5-A be submitted to the Department for approval before that line is constructed.

4. That detailed plans of the sewers in Willow avenue, Monroe avenue, Cherry avenue and Bonnet avenue so designed as to permit of conveying the sewage from District 5-A and the Cherry avenue section to the Bonnet avenue works be submitted to this Department for approval before the construction of the pumping station or the Bonnet avenue sewage treatment plant.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 3, 1917

The plans were approved Oct. 5, 1917.

MASSENA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for proposed sanitary sewer extensions in the village of Massena, St. Lawrence county, submitted to this Department for approval by the village engineer on behalf of the Board of Trustees on June 25, 1917.

The village of Massena which had a population of 4,614 in 1915 according to the last State census, is situated on the Grasse and Raquette rivers, about 7 miles above the confluence of the Grasse and St. Lawrence rivers and about 5 miles from the Canadian boundary line. The records of the Department show that plans for a comprehensive sewer system covering practically the entire village and discharging into the Grasse river at two points and into the Raquette river at one point, were approved on February 14, 1900. Provisions were also made by these plans for the treatment of the sewage in a chemical precipitation plant to be located at each outlet and to be constructed when necessary. On June 27, 1909, plans for proposed sewers in the Pine Grove addition of the village were approved.

Plans now submitted provide for the construction of some 3,000 feet of sanitary sewers in Grove street, Ridgewood avenue, Walnut avenue, Laurel avenue, East Ovis street and through private property between East Ovis street and Water street, discharging into the Grasse river through one of the existing outlet sewers. The proposed sewers are to vary from 8 to 16 inches in diameter and are to be constructed with slopes of from .5 per cent to 4.25 per cent. Manholes are to be constructed at all points of slope and alignment and the maximum spacing between manholes will not exceed 400 feet.

The lower sections of the proposed sewers appear to have been designed with capacities somewhat larger than necessary to care for the sanitary sewage of the section to be served by them. This, however, is not a serious objection inasmuch as it will permit of making extensions to the sewers without danger of overtaxing them in the future. The sewers if properly constructed should satisfactorily meet the requirements for which they were designed. The dilution afforded by Grasse river is large and no public water supplies are obtained from the river below the village.

In view of the above I would recommend that the plans be approved and a permit be issued allowing the discharge into Grasse river of sewage to be collected by the proposed sewers.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 29, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Trustees of the village of Massena to discharge sewage from the proposed sewer extensions in Grove street, Ridgewood avenue and East Ovis street and through private property into the waters of the Grasse river through existing outlet sewers within the municipality of Massena in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

M. NICOLL, JR.,
Acting Deputy State Commissioner of Health

June 29, 1917

MT. PLEASANT (John T. MacCurdy)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewage disposal for the property of Dr. John T. MacCurdy near Pleasantville in the town of Mount Pleasant, Westchester county, resubmitted to this Department for approval on April 14, 1917.

Location

The property is located about one mile west of the Pleasantville R. R. station. It is on the watershed of the Pocantico river which is used as a source of water supply furnished by the Consolidated Water Company of Suburban New York to the village of North Tarrytown and neighboring communities in Westchester county after filtration in pressure mechanical filters and sterilization with liquid chlorine.

General description

According to the reports submitted by the designing engineers, the maximum population to be cared for will be 18 persons and the daily water consumption is estimated at 1,800 gallons. The soil at the disposal site is claimed to be a heavy loam and the ground water is said to be at a depth of about 5 feet below the surface of the ground.

Plans for the disposal of the sewage from this property in a sewage disposal plant consisting of settling tanks, dosing tank and an artificial under-drained subsurface irrigation system were first submitted for approval on March 13, 1917. It was found from our examination of these plans that although they had been designed in general to meet the local requirements for sewage disposal, the subsurface irrigation system was designed to operate at an excessively high rate. The plans were accordingly returned to the designing engineers with the recommendation that they be so revised as to provide for a rate of operation of not higher than 30,000 gallons per acre per day. A conference was subsequently held with the designing engineers in this office when the

design of the disposal plant was reviewed. The engineers were advised that alternate plans providing for a subsurface irrigation system containing 100 feet of distributing tile per person would be considered. Plans designed along these lines were submitted for approval on April 14, as noted above.

Sewers

These plans show that sewage from the main building is to be conveyed to the sewage disposal plant through some 350 feet of 6-inch vitrified tile pipe laid on a fairly steep slope. The sewage from the barn on the property is to be conveyed to the disposal plant through some 700 feet of 4-inch pipe laid with a slope of from 1.5 to 2.97 per cent. Some 250 feet of the upper portion of this sewer is to pass near and across two small streams and is, therefore, to be constructed of cast-iron pipe. The remainder of this sewer is to be of vitrified tile pipe.

Sewage disposal

The sewage disposal plant is to consist of two settling tanks, dosing tank and subsurface irrigation system. The settling tanks, which are to be covered, are to be operated in a series. The first tank is to be 6 feet in diameter and 6 feet deep below the flow line and the second tank is to be 5 feet in diameter and 6 feet deep below the flow line. The combined capacity of these tanks will be about 2,000 gallons and will, therefore, provide for a detention period of the sewage of approximately one day on the basis of design used, namely, a flow of 1,800 gallons per day.

Sludge disposal

No provisions have been made by the plans for the disposal of sludge from the settling tanks. It is important that the sludge should be removed from the settling tanks at least once a year, especially from the first settling tank where most of the sludge will probably accumulate. For a small plant of this kind, the sludge could either be removed by bailing or by pumping it out with a diaphragm pump into watertight barrels or other suitable containers. The sludge should be properly buried or placed in trenches and covered over at a distance of not less than 300 feet from any stream or watercourse tributary to the Pocantico river, as required by the rules and regulations for the protection from contamination of the water supply furnished by the Consolidated Water Company of suburban New York.

Dosing tank

The dosing tank, which is to be located adjacent to the second settling tank, will have a capacity of 19.5 cubic feet. It is to be provided with an automatic discharge siphon by means of which the sewage is to be discharged intermittently to the subsurface irrigation system.

Subsurface irrigation system

The distributing system of the subsurface irrigation system is to consist of a gate chamber, 3 main distributors, and 12 lines of lateral distributors 150 feet long each. Each main distributor is to serve 4 lines of lateral distributors. The laterals are to consist of special double horseshoe distributing tile laid in trenches with slopes of .25 per cent. The plans indicate that the distributors are to be surrounded with coarse material. The system will contain 1,800 feet of distributing tiling equal to 100 feet per person. It will cover an area of about .27 acres and will, therefore, be required to operate at the rate of about 7,000 gallons per acre per day when serving 18 persons and assuming a daily per capita rate of sewage contribution of about 100 gallons.

Conclusions and recommendations

From our careful examination of plans, I am of the opinion that the proposed sewage disposal system, if properly constructed in accordance with the plans and if operated with care and efficiency should satisfactorily care for the sewage contributed by a population of 18 persons. Furthermore, it appears that there is sufficient area available to permit of extending the subsurface irrigation system should it be found necessary to do so in the future.

I would, therefore, recommend that the plans be approved on condition that no sludge be discharged into any stream or other body of water and that the sludge shall not be buried or discharged onto the surface of the ground within 300 feet of any stream or watercourse tributary to the Pocantico river.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *April* 20, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to Dr. John T. MacCurdy to discharge effluent from the proposed sewage disposal plant for his property near Pleasantville into the waters tributary to the Pocantico river within the town of Mount Pleasant in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewers and the sewage disposal works shown by the plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That no sewage sludge or scum from any part of the disposal works shall be discharged into Pocantico river or any other watercourse or body of water.
5. That all sewage sludge or scum from the disposal works shall be properly buried beneath the ground surface at points not less than 300 feet from any stream or watercourse tributary to the Pocantico river.

M. NICOLL, JR.,
Acting Deputy State Commissioner of Health

April 30, 1917

MT. PLEASANT (Rosary Hill Home)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewage disposal for the Rosary Hill Home near Hawthorne in the town of Mount Pleasant, Westchester county, submitted to this Department for approval on April 28, 1917.

This institution is a cancer hospital maintained by the Servants of Relief for Incurable Cancer and is located near the Hawthorne railroad station of the Harlem division of the N. Y. C. & H. R. R. R., about ½ mile from the

Saw Mill river. A number of inspections of the institution have been made by representatives of this Department as the results of complaints of insanitary conditions caused by the overflow of cesspools.

It was found from these inspections that the institution has sufficient capacity to accommodate 75 patients but that the average population including patients and attendants is about 60. The water supply is derived from a 2-inch driven well and the water consumption is estimated at from 4,000 to 6,000 gallons per day. The sewage of the institution is cared for in cesspools which are inadequate to properly care for the sewage with the result that the overflow from the cesspools flows over the surface of the ground giving rise to very insanitary conditions below the hospital. The soil on the hospital grounds is of a sandy character and overlies rock which outcrops on the property.

Plans for the disposal of sewage for the institution were first submitted for approval on October 25, 1916, and after careful examination of them, which showed that they were not in satisfactory condition for approval, they were returned on November 2, 1916, with the recommendation that they be so modified as to provide for a more efficient and satisfactory method of disposal of the sewage. The plans now submitted were prepared by the Wulff Engineering Co., Inc., civil and constructing engineers, Tarrytown, N. Y., and comprise duplicate blue prints of the following sheets: (1) General plans showing relative location of institution and sewage disposal plant. (2) Details of the disposal plant.

Sewage disposal plant

The proposed disposal plant is to consist of a settling tank, dosing tank and subsurface irrigation system to be located across the driveway below the institution. It appears that a number of lots are to be acquired by the hospital as a site for the disposal plant. The report of the designing engineers submitted with the plans states that the soil at the disposal plant site is a sandy loam well suited for this type of disposal. The entire area is to be grubbed before the disposal plant is installed. It is important that the ground be properly rolled and compacted before laying the distributing system.

Settling tank

The proposed settling tank is to be a covered concrete structure 20 feet long by 8 feet wide by 6 feet deep inside dimensions with a depth below the flow line of 5 feet. It will have a capacity of 6,000 gallons, equal to about one day's flow of sewage. The tank is to be provided with a sludge pipe by means of which the sludge may be drawn off by gravity flow and disposed of in trenches near the tank.

Dosing tank

The dosing tank is located adjacent to the settling tank and has a capacity of about 130 cubic feet. It is to be provided with a 5-inch discharge siphon by means of which the settled effluent from the settling tank is to be discharged intermittently into the distributing system of the subsurface irrigation system.

Subsurface irrigation system

The proposed subsurface irrigation system is to consist of a 3-way manhole, 3 diverting chambers and 24 lines of 4-inch distributing tile, about 170 feet long each. Each diverting chamber is provided with 8 outlets, each of which discharges into one line of distributing tile. These chambers are so arranged as to permit of shutting off the flow from 4 or from all of the lines at each diverting chamber, thereby permitting of throwing out of use any section of the field if necessary and giving considerable flexibility of operation.

The system is to contain about 4,000 feet of tiling equal to about 66 feet per person and will cover an area of approximately .6 acre and will, therefore, provide for a rate of operation of about 10,000 gallons per acre per day. Each line of distributing tile which is to consist of 4-inch agricultural tile laid with open joints protected with tar paper, is to be laid parallel with the contours of the ground. The tile is to be laid in trenches 16 inches deep and are to be surrounded with clean sand and gravel. Two or three inches of sand or gravel should be placed below the lines of lateral distributors and it would be well also to cover the lines with two or three inches of the same material.

Conclusions and recommendations

From our careful examination of the plans I am of the opinion that the proposed sewage disposal plant if properly constructed in accordance with the plans and if operated with care and efficiency should satisfactorily care for the sewage contributed by the present population of the hospital and I would, therefore, recommend that the plans be approved.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 3, 1917

The plans were approved May 9, 1917.

MT. PLEASANT (Westchester Co. Penitentiary)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for the disposal of sewage at the Westchester county penitentiary submitted to this Department for approval on March 22, 1917. Additional data submitted at your request were received on April 10, 1917.

The penitentiary is situated in the southern part of the town of Mt. Pleasant near the divide between the Saw Mill river and the Bronx river at a point about one mile east of Eastview. According to the data submitted by the designing engineers the institution will have a minimum population of 100 and a maximum population of about 300 with an average of about 200. The average daily water consumption is estimated to be 20,000 gallons. The water supply of the institution is obtained from wells located near Saw Mill river at a point about 5,000 feet from the institution.

Sewage disposal

A communication received from the designing engineers, states that plans have practically been completed for conveying the sewage from the penitentiary and from the proposed alms house and the new county hospital located near the penitentiary to and discharging it into the upper end of the Bronx Valley sewer at White Plains. Until this project is carried out it is proposed to care for the sewage from the penitentiary in a sewage disposal plant consisting of a screen chamber, settling tank, dosing tank and subsurface irrigation system.

Screen chamber

The screen chamber is to be located at the inlet end of the settling tank. It is to be 4 feet square and 3 feet deep inside dimensions and is to be provided with a bar screen composed of ¼-inch by 1-inch iron bars spaced 1½ inches in the clear.

Settling tanks

From the screen chamber the screened sewage is to be discharged into a covered settling tank through a submerged inlet. The proposed tank is to be rectangular in plan, 25 feet long, 10 feet wide inside dimensions and from 8 to 10 feet deep below the flow line. It will have a capacity of about 16,000 gallons and will, therefore, provide for a detention period of the sewage of about 20 hours on the basis of design used.

Dosing tank

From the settling tank the clarified effluent is to be discharged through a submerged outlet into a dosing tank located at the outlet end of the settling tank. This tank is to be provided with 2 6-inch automatic discharge siphons of the Miller type by means of which the settled sewage is to be discharged alternately into the two sections of the proposed subsurface irrigation system.

Subsurface irrigation system

According to the report submitted with the plans the soil at the site of the disposal field is gravel mixed with more or less clay to a depth of about 4 feet. It is stated that the soil is rather compact and at a depth of 4 feet changes sharply to a very stiff hard-pan.

The subsurface irrigation system is to contain 6,000 feet of 4-inch distributing tile laid in trenches 18 inches wide and about 2½ feet deep. The joints of the distributing tile are to be covered with strips of tar paper and the lines of tile in the trenches are to be surrounded and covered to a depth of 12 inches with unscreened sand. The distributors which are to be spaced 15 feet center to center are to be laid on slopes of 1/32 inch per foot.

Each section of the subsurface irrigation system is to be provided with 6 distributing or gate chambers from each of which is to extend 6 lines of lateral distributors. These distributing chambers are so arranged that the lateral lines connected with each chamber will be filled with sewage before it overflows into the next lower distributing chamber. This arrangement should provide for a satisfactory distributing of the sewage through the entire system.

The system will contain 6,000 feet of lateral distributors equal to from 20 to 60 feet per person and will cover an area of about 2 acres. The rate of operation will therefore be from 5,000 to 15,000 gallons per acre per day. Although the soil at the proposed site is not very favorable for the disposal of sewage by means of subsurface irrigation, it is probable that with the comparatively low rate of operation and the rather liberal amount of distributing tiling to be used it will satisfactorily care for the sewage from the penitentiary provided the plant is properly constructed in accordance with the plans. There appears, moreover, to be adequate area available for the extension of the subsurface irrigation system should it be found necessary to do so in the future. It is important, however, that the disposal plant shall be operated with care and efficiency at all times.

In view of the above I would recommend that the plans be approved on condition that whenever required the subsurface irrigation system shall be enlarged or extended or that some other equally satisfactory method of disposal shall be provided in accordance with plans to be approved by this Department.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *April* 17, 1917

The plans were approved April 17, 1917.

NEW CASTLE (David M. Goodrich)

Plans for a sewage disposal plant to serve the buildings on the premises of Mr. David M. Goodrich, near Mt. Kisco in the Town of New Castle, Westchester Co., N. Y., were submitted to this Department for approval on June 28, 1917. The plans contemplated the construction of a disposal plant on the said premises consisting of a settling tank, a dosing tank and a subsurface irrigation field. After a careful examination by the Engineering Division the plans were approved on August 24, 1917.

NEW HARTFORD (Sewer District No. 1)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewer extensions in Sewer District No. 1 in the town of New Hartford, Oneida county, submitted to this Department for approval by the sewer commissioners on July 23, 1917.

Original plans for sewerage and sewage disposal for this sewer district which is situated between the city of Utica and the village of New Hartford, were approved by this Department on April 12, 1912. These plans provided for a comprehensive sanitary sewer system and for a sewage disposal plant consisting of an Imhoff tank and sludge drying bed to be constructed and operated in conjunction with the village of New Hartford. The sewer system and sewage disposal plant provided for by these plans have been constructed and put in operation.

The plans now submitted provide for the construction of some 510 feet of 6-inch sewers in Fairfax place and Cornwall place tributary to the existing 10-inch sewer in Sunset avenue. Although the original plans approved showed sewers in these streets they did not show details of the sewers.

The proposed sewer in Fairfax place is to be 170 feet long and is to be laid on a slope of .706 per cent. The sewer in Cornwall place is to about 339 feet long and is to be laid on a slope of 1.325 per cent. A flush tank is to be constructed at the upper end of the proposed sewer in Fairfax place and a manhole at the intersection of the sewer in this street with the sewer in Cornwall place. Another manhole is also to be provided at the intersection of the proposed sewer in Cornwall place with the existing sewer in Sunset avenue.

From our examination of the plans it was found that the proposed sewers if properly constructed should satisfactorily meet the needs for which they were designed and I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge of sewage from these sewers into a stream tributary to Sauquoit creek on condition that the sewage to be collected by these sewers shall first be passed through the existing sewage disposal plant.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July* 27, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board

of Sewer Commissioners, Sewer District No. 1, town of New Hartford, to discharge sewage from the proposed sewers in Fairfax place and Cornwall place into the waters of a branch of Sauquoit creek through the outlet of the sewage disposal plant of this sewer district within the town of New Hartford, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or charge when in the judgment of the State Commission of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers or the sewage disposal works.
4. That all the sewage to be collected by the proposed sewers shall be passed through the sewage disposal works of Sewer District No. 1, town of New Hartford.

M. NICOLL, JR.,
Deputy State Commissioner of Health.

August 1, 1917

NEW HARTFORD (Standard Silk Co.)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of plans for sewage and sewage disposal for a portion of the unincorporated village of Chadwicks, town of New Hartford, Oneida county, on the property of the Standard Silk Company.

These plans were first submitted for approval by the Standard Silk Company on July 16, 1917, and after a preliminary examination of them by the engineering division and a conference in this office with the designing engineer they were returned for revision on August 22, 1917. On August 27, 1917, these plans, revised in general to meet the requirements of this Department, were again submitted.

The plans comprise duplicate copies of the following:

1. Plan and profile of district to be served by proposed sewers and disposal plant.
2. Plan and section of disposal plant.

The village of Chadwicks is located on the D., L. & W. R. R. and Sauquoit creek about 7 miles south of Utica. The population of the village to be served by the proposed sewers and disposal plant is about 100. Outside privies are provided and it is not proposed at present to discharge excretal wastes into the sewer system. The sewage will, therefore, be chiefly sink and wash water which it is estimated will amount to about 1,200 gallons per day.

The proposed plans provide for permanent sewers to form part of a comprehensive sewer system for the portion of the village north of Sauquoit creek, while the disposal plant is a temporary structure to be used until a larger proposed disposal plant, to serve the entire sewer district which it is proposed later to form, is constructed.

The proposed sewer system is to consist of vitrified tile pipe from 6 to 8 inches in diameter. The proposed disposal plant will consist of a settling tank 5 x 10 feet in plan and 5 feet deep, giving a capacity of 1,875 gallons and a subsurface disposal field of about 400 feet of 4-inch tile pipe with open joints. The pipe is to be laid in about 19 parallel lines spaced 4 feet apart.

The plans show only about 6 inches of cover, consisting of cobble stones, over the tile distributing pipe of the disposal field. This is not sufficient to prevent freezing and it is, therefore, recommended that over the 6 inches of cobble stones from 6 to 12 inches of soil be placed to prevent the field from freezing and also the sewage from rising to the surface and passing over ground to ditch. The effluent from the disposal plant will flow into the waters of the State tributary to Sauquoit creek.

From our careful examination of the plans it would appear that the proposed sewer system and sewage disposal plant if properly constructed in accordance with the plans and the modifications suggested in this report should satisfactorily treat the sewage contributed to it.

I would, therefore, recommend that the plans be approved and that a permit be issued allowing the discharge of sewage from the proposed sewage disposal plant into the waters of the State tributary to Sauquoit creek and that the permit contain in addition to the usual revocation and modification clauses the following conditions:

1. That only sink and wash water and no excretal wastes, or storm or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
2. That the 6 inches of cobblestones or gravel over the tile pipe of the disposal field be covered with from 6 inches to 12 inches of soil to prevent freezing of sewage in pipes.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 11, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to Standard Silk Company of Chadwicks, Oneida county, to discharge effluent from the sewage disposal works to be constructed by Standard Silk Company to treat sewage from their property into the waters of the State, tributary to Sauquoit creek at Chadwicks within the town of New Hartford in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewer systems and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans except as amended by section 5 of this permit.
4. That only sink and wash water, and no excretal wastes or storm or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
5. That the 6 inches of cobblestones or gravel over the tile pipe of the disposal field be covered with from 6 to 12 inches of soil to prevent freezing of sewage in the pipes.

M. NICOLL, JR.,
Deputy State Commissioner of Health

September 11, 1917

NEW ROCHELLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for the disposal of sewage for the Burling Brook District of the city of New Rochelle, Westchester county, submitted to this Department for approval by the Department of Public Works of the city on April 27, 1917.

The sewerage conditions of the village and the actions taken by this Department in the past with reference to plans for sewerage and sewage disposal for the city of New Rochelle are covered fully in our report on examination of general plans for the disposal of sewage of the city dated December 29, 1914, and will, therefore, not be reviewed at this time except to state owing to the condition of pollution created by the discharge of sewage from the city and as the result of complaints of these conditions, the matter of providing satisfactory means for the collection and disposal of the sewage of the city has been taken up with the local authorities repeatedly during the past few years and they have also been advised that it would be necessary for this Department to defer action on further plans for sewer extensions pending the submission of satisfactory plans for sewage disposal.

The city of New Rochelle which has an area of approximately 3,200 acres is divided into four major sewer districts and, except for a relatively small district known as the "Residence Park" district having an area of about 230 acres, the city is sewered on the separate plan. The sewage from the greater portion of the village comprising two sewer districts having a combined area of some 2,200 acres, is at present, discharged without treatment into Long Island Sound through a 24-inch pipe in deep water at a point near Bailey's Rock about 3,000 feet from the shore of the mainland. The sewage from the "Residence Park" district is discharged without treatment directly into New Rochelle creek, an arm of Long Island Sound, at the foot of Drake avenue extended.

The sewage from the greater portion of the Burling Brook district having an area of about 730 acres, is at present treated in a sewage disposal plant consisting of 5 chemical precipitation tanks located at Morgan street and known as the Morgan street plant. The effluent from this plant is discharged into comparatively shallow water of Long Island Sound near Glen Island. The sewage from a number of houses south of the disposal plant is discharged without treatment into the effluent pipe below the plant. The dry weather flow of sewage tributary to this disposal plant is claimed to be about 750,000 gallons per day and the wet weather flow is placed at 2,000,000 gallons per day. It is apparent that steps should be taken by the city to eliminate this large amount of storm or ground water which now reaches the sewers either by infiltration through the joints of the pipe or through storm water inlets or both.

The plans now submitted were prepared by Mr. James C. Harding, civil and sanitary engineer, New York City, and provide for the installation of a 1,000,000-gallon unit disposal plant to treat the sewage tributary to the present Morgan street plant at the site of this plant. According to the data submitted with the plans the proposed process of treatment called the "New Rochelle" process is the outcome of about one year of experiments carried out by Mr. Harding in conjunction with the city authorities at the Morgan sewage disposal plant and involves the filtration of the sewage through comparatively fine gravel with provisions for the aeration and cleaning of the filters.

Some 20 acres of land have been acquired by the city in the vicinity of the Morgan street plant to be used for sewage disposal and garbage incineration purposes and it appears from the data submitted with the present plans that if the proposed method of treating the sewage proves to be successful it is the intention of the city to install additional units of the proposed type of disposal and to intercept and convey the entire sanitary sewage of the city to the proposed site for disposal.

Sewage disposal works

The proposed disposal works are to consist of a screening plant and 20 units of the so-called "New Rochelle" filters with the necessary pumps, air compressors, blowers, valves and piping to operate the filters. The nominal capacity of the works is 1,000,000 gallons which is approximately equal to the flow treated at the present Morgan street plant.

Screening plant

The proposed screening plant is to be located on the line of the present trunk sewer a short distance above the filters. The plans show both bar screens and a mechanical fine screen of the Riensch-Wurl type. According to the data submitted with the plans it is proposed to ask for bids on various types of screens. If bar screens are to be used it is proposed to install 4 screens having clear openings between the bars of from 1-inch to 3/16-inch. If a mechanically operated fine screen is to be installed it is to have openings of 1/16-inch smallest dimensions.

Filters

Filters are to be formed by the reconstruction of 2 of the 5 present chemical precipitation tanks and are to be divided into 20 units 11 feet 8 inches long and 8 feet 3 inches wide each, giving a total superficial area of 1,930 square feet, equal to about .045 acres. The bottom of each filter is to be constructed with 12 parallel V-shaped troughs spaced about 1 foot center to center. In the bottom of each of these troughs is to be placed a 2-inch perforated air pipe connected with a 4-inch manifold air main which, according to the report of the designing engineer, is to connect with an air blower and an air compressor to be located in the operating-house. The filters are to be filled with gravel to a depth of about 3 feet. The gravel in the troughs above the air pipes is to vary from ½ inch to 1 inch in size and the gravel above this layer is to vary from ¼ to ½ inch in size.

The filters are to be provided with two 12-inch wrought iron influent pipes and two 12-inch wrought iron effluent pipes placed in a pipe gallery between the two groups of filters. A 4-inch lateral influent pipe and a 4-inch lateral effluent pipe is to extend from the 12-inch mains to each filter and each of these 4-inch laterals is to be provided with a hydraulic valve. Each unit of the filter is also to be provided with three 2-inch wash water pipes to be connected with a 4-inch suction main leading to the wash water pump. Three baffles are to be installed in each unit of the filter and these baffles are to be so arranged as to cause the sewage to flow downward through the first section, upward through the second, downward through the third and upward through the fourth section of the filter. As noted above, the filters will have a superficial area of about .045 acres and will, therefore, be required to operate at the rate of from 16,000,000 to 44,000,000 gallons per acre per day, based on daily flows of from 750,000 gallons to 2,000,000 gallons per day.

Operation

The method of operation of the works is quoted from the report of the designing engineer which is as follows:

"The sewage entering the plant from the present 24-inch inlet sewer will be passed through fine screens either mechanically operated and cleaned, or hand cleaned. In the former case screen openings will be 1/16 inch smallest dimensions, and in the other case will be 3/16 inch smallest dimensions. After passing through the screens the sewage will flow through the present channel to the two 12-inch inlet pipes in the filter galleries and from these will be discharged to the filters through 4-inch branches

controlled by hydraulically operated gate valves. The sewage on entering the filter will build up whatever head is required to allow it to pass to the outlet end of the filter, and depending of course, somewhat on the freedom of the filter from foreign matters. The sewage will pass downward in the first filter compartment, upward over a baffled wall in the second compartment, downward in the third and upward in the fourth compartment, from which it will be removed by a trough connected through a short 4-inch pipe to the 12-inch effluent line. This 4-inch pipe being controlled by a 4-inch hydraulically operated valve.

During the passage of the sewage through the filter, air will be admitted in sufficient quantities and as frequently as is found necessary, so that there will always be some oxygen at all places in the filter. From experiment with similar filters there has been no trouble experienced in shutting off the air for as long a period as one hour after aeration to a point where complete saturation of the sewage with oxygen was reached. In practice, however, it is expected that air will be admitted for short intervals of time, say for 5 minutes, to each filter unit and will then be omitted for from 3 to 5 times the aerating period, or say perhaps 20 minutes.

At certain periods, as found necessary, the filters will be washed by admitting air through the air manifold at the bottom under high pressure and in sufficient quantity to thoroughly agitate the filter gravel at the same time forcing collected suspended matters to the top of the filter. With these coarse grained filters it is found that the air passing upward through the voids in the gravel act somewhat in the manner of air lifts, the bubbles of air carrying with them the suspended matters. To provide for the removal of this suspended matter, wash water pipes are introduced at the top of each section of each filter and these pipes are connected to a wash water pump to be located in the operating building. It is intended if fine screens, mechanically cleaned, are used to return this water to the sewer above the screen and remove the washed out suspended matters with the screenings. If this is not found to be satisfactory, it is proposed to return this wash water into a settling tank where the liquid can be removed and the easily settling out solids treated on drying beds in the same manner as is now treated the sludge from the mechanical precipitation works. The effluent from these works, if equal to that produced in the experimental plants, will be entirely clear, stable and with at least 95 per cent of the bacteria removed.

Conclusions and recommendations

There is at present no plant of this type in operation for the treatment of sewage. The experimental plant at New Rochelle, which is not now in operation, was not visited by one of our representatives so that we have no first hand knowledge of its practicability and efficiency and the proposed plant, therefore, can not be considered other than in the light of an experiment. The plans, moreover, are somewhat general and certain details are lacking such as pumps, motors and piping. It appears also that the proposed method of disposing of the sludge from the filters has not been definitely determined upon, that is, as to whether it is to be returned to the screens and removed and disposed of with the screenings or discharged into settling tanks and removed to the sludge drying beds after settling. The method of disposal of sludge is an important question and should be given careful consideration. It is probable that some difficulty may also be experienced in effectively cleaning the filters with air alone, but it is understood that the designing engineer believes that these problems cannot be successfully worked out.

If the proposed plant will, in practice, continue to produce results comparable to those which seem to have been obtained at the experiment plant, the proposed plant should produce a satisfactory effluent and one that may be safely discharged into Long Island Sound without objection at this time. I can, therefore, see no objection to approving the plans for the proposed disposal plant with the understanding that it is in its experimental

stage and on the condition that if the plant should not give satisfactory results, satisfactory detailed plans for the efficient sedimentation of the sewage tributary to it together with general plans for supplementary or more complete treatment of such sewage shall be submitted for approval. Provision should also be made within a reasonable time for the interception and treatment of the entire sanitary sewage of the city at the proposed site or at some other suitable site for disposal.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge into Long Island Sound of effluent from the proposed sewage disposal works on the following conditions:

1. That should the proposed disposal plant not give satisfactory results, detailed plans for effective sedimentation of the sewage tributary to the proposed works together with general plans for supplementary or more complete treatment of such sewage shall be submitted for approval.

2. That on or before March 1, 1919, satisfactory detailed plans for the interception and treatment of the entire sanitary sewage of the city shall be submitted for approval and that after the approval of said plans any or all portions of the works provided for by such plans shall be constructed and put into operation whenever required by the State Commissioner of Health.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 21, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Department of Public Works of New Rochelle to discharge effluent from the proposed sewage disposal works for the Burling Brook District into the waters of Long Island Sound through the existing outlet sewer within the municipality of New Rochelle, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewage disposal works.

4. That no sewage sludge from any part of the disposal works shall be discharged into Long Island Sound or into any other watercourse or body of water.

5. That should the proposed disposal plant fail to give satisfactory results, detailed plans for effective sedimentation of the sewage tributary to the proposed works together with general plans for supplementary works for more complete treatment of such sewage shall be submitted for approval and such works constructed and put in operation whenever required by the State Commissioner of Health.

6. That the outlet pipe from the disposal plant shall be extended into Long Island Sound under plans approved by this Department whenever required by the State Commissioner of Health.

7. That on or before March 1, 1919, satisfactory detailed plans for the interception and treatment of the entire sanitary sewage of the city shall be submitted to this Department for approval; and that upon the approval of said plans any or all portions of the works provided by such plans shall be constructed and put in operation at such time or times thereafter as the State Commissioner of Health may designate.

M. NICOLL, JR.,
Acting Deputy State Commissioner of Health

May 29, 1917

NIAGARA COUNTY TUBERCULOSIS HOSPITAL

Supplementary plans for sewage disposal for the Niagara County Tuberculosis County Hospital were approved August 3, 1917.

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Niagara County Tuberculosis Hospital to discharge effluent from the proposed sewage disposal plant to treat the sewage from said hospital into the ground waters tributary to Eighteen Mile Creek within the town of Lockport, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

5. That no sewage sludge from any part of the disposal works shall be discharged into Eighteen Mile creek or any other body of water, and that satisfactory plans for the disposal of sludge from the settling tank be submitted to this Department for approval before the completion of the proposed disposal works.

6. That not less than 50 feet of tiling per person served equal to 7500 feet for 150 persons shall be provided for and that when the population contributing sewage to the proposed sewage disposal works shall exceed 150 the subsurface irrigation system shall be proportionately enlarged or extended in accordance with the approved plans.

7. That whenever required by the State Commissioner of Health satisfactory detailed plans for some other suitable method of disposal of sewage from this hospital shall be submitted to this Department for approval and after the approval of said plans any or all portions of the proposed sewage disposal works provided for by such plans shall be constructed and put in operation.

M. NICOLL, JR.,
Deputy State Commissioner of Health

August 3, 1917

NIAGARA FALLS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of plans for sewer extensions to be constructed in Second street, 24th street, Buffalo avenue, and across the lands of the Niagara Falls Power Company in the city of Niagara Falls, Niagara county, N. Y., submitted to this Department for approval by the city manager on behalf of the city on March 31, 1917. Additional information in regard to the plans and local conditions was furnished to the department on November 15, 1917.

Plans for a sewerage system for the village of Niagara Falls were approved by this Department on October 14, 1891. Amendments to these plans changing the route of the tunnel trunk sewer on Niagara and Falls streets were approved on January 11, 1893. Plans for a comprehensive sewerage system to serve the larger part of the city, or incorporating the existing sewers, were approved July 8, 1907, and plans for a trunk sewer and laterals to serve the section east of Sugar street were approved January 29, 1908. All of the sewers of the city are designed and constructed to carry both storm water and sanitary sewage.

The plans now submitted contemplate the construction of three separate extensions located in different parts of the city but all discharging into the present 7 feet by 9 feet tunnel trunk sewer in Niagara street which empties into the Niagara river about ¼ mile below the Falls. No disposal plant of any kind is provided for the treatment of the sewage nor is the construction of such a plant contemplated by the present plans. As the minimum flow of the Niagara river is over 177,000 cubic feet per second, affording an ample dilution to prevent the creation of any nuisance, the matter of the purification of the sewage has not been given serious attention by the city authorities. It will be noted, however, that Youngstown, a village located about 12 miles below Niagara Falls, takes its water supply from the river; and that the village of Lewiston, about 6 miles below the city, is contemplating the construction of a water works system and intends to use the Niagara river as its source of supply. The treatment of the sewage of the city of Niagara Falls has been considered by the International Joint Committee on the Pollution of Boundary Waters, and a report dealing with the matter will be found on page 133 of the report of their consulting sanitary engineer, issued under date of March 8, 1916.

The Second street sewer, the first of the proposed sewers mentioned above, is to be constructed for the purpose of relieving the congested condition of the 24-inch line on the south side of Falls street west of Second street by diverting the flow from that portion of the line lying east of Second street to the present 7 by 9 trunk sewer in Niagara street. The sewer will be 830 feet long, and is to be built with a cross section 5 feet by 6 feet and a grade of 0.3 per cent. This size and grade will give a capacity considerably in excess of that required to care for the run-off from the area tributary to the sewer which is approximately 60 acres. In explanation of this fact, the engineer in his report states that on account of the heavy traffic on the street the use of an open cut will not be possible and that the section selected is the minimum which can be readily built by tunneling. The proposed grade of 0.3 per cent will give a satisfactory velocity if the invert is properly constructed. Shafts 8 feet by 10 feet in cross section are to be constructed at each end of the sewer to provide means of entrance for cleaning and inspecting the line.

The 24th Street trunk sewer is a part of the general sewerage system of the city, plans for which were approved by this Department on July 8, 1907. The plans now submitted differ from the original ones in that the dimensions of the different sections of the sewer have been increased. No changes, however, have been made in the route of the trunk line, nor in the size or arrangement of the laterals tributary to the trunk. The sewer is to extend along 24th Street from Falls street to LaSalle avenue and to vary in diameter from

78 inches at the former street to 66 inches at the latter. The sewer as originally planned varied in diameter from 58 inches to 48 inches between the same points. The minimum grade of the line is 0.2 per cent. Manholes are provided at frequent intervals, the maximum distance between the manholes being 736 feet, occurring on a section where the diameter of the sewer is 72 inches. The area tributary to this trunk is 183.5 acres and the maximum rate of run-off is estimated at 188 cubic feet per second, a flow which the proposed sewer can readily carry. It appears from the examination of the plans that the portion of this sewer between Falls street and Ferry street has already been constructed.

The sewer which it is proposed to build in Buffalo avenue and across the land of the Niagara Falls Power Company, is to be constructed to relieve the congested condition of the present Union street sewer which has proved to be of insufficient capacity to carry the wastes discharged from the manufacturing plants located in that part of the city. The sewer will extend from the tunnel trunk sewer in Royal avenue across the property of the Niagara Falls Power Company to Buffalo avenue and along Buffalo avenue to Union street, relieving the Union street sewer of the flow from the district above the intersection of Union street and Buffalo avenue. The total length of the line will be about 3500 feet, and the diameter will vary from 60 to 42 inches. The minimum grade is 0.2 per cent. Manholes are provided at frequent intervals for inspecting and cleaning the line. The area tributary to this trunk is about 120 acres and the maximum rate of run-off is estimated at approximately 120 cubic feet per second. In addition to this, the sewer will receive from the factories in the district a discharge of trade wastes estimated at 22 cubic feet per second, making the total flow to be taken care of about 142 cubic feet per second. The sewer as designed appears to be of sufficient capacity to care for the maximum flow that will probably reach it.

The trunk sewer in Niagara and Fall streets into which the proposed trunk lines will discharge is an unlined tunnel 7 feet high and 9 feet wide, built with a fall of about 2.5 feet per thousand feet. The question as to whether or not the capacity of this sewer is sufficient to care for the flow from the district drained has been under consideration for some time. In a report dated March 24, 1915, Mr. F. S. Parkhurst, Jr., then city engineer of Niagara Falls, stated that the capacity of the trunk was not sufficient to care for the drainage of the district then tributary to it if the district were fully built up, and that it could not possibly carry the additional sewage that would reach it from the new trunks, the construction of which was then under consideration. Assuming that 20 per cent of the rainfall would reach the sewer, Mr. Parkhurst estimated that the rate of flow in the sewer from the district then tributary to it would at times reach 1,000 cubic feet per second. The capacity of the sewer flowing full he estimated at 320 cubic feet per second. While this estimate of the capacity of the sewer appears to be too low for this sewer if it is properly constructed, the line obviously will not care for the estimated runoff from the district even though additional head is obtained by the sewage backing up in the manholes at the upper end of the line. No trouble has, however, been experienced as yet, due to the fact that a considerable part of the district drained is not closely built up and that a large part of the storm water is consequently absorbed by the ground. The building of the proposed trunk sewers, increasing the drainage area tributary to the main trunk, and the construction of more pavements and buildings on the present drainage area, increasing the percentage of storm water reaching the sewers will, undoubtedly, overtax the capacity of the Niagara street trunk in the near future. It would appear advisable, therefore, that the city authorities consider at an early date the making of such alterations or additions to the present system of trunk lines as may be necessary to provide sufficient capacity for the maximum rate of flow that will probably occur within a reasonable future period.

In view of the results of our examination of these plans after careful consideration of the design of the proposed trunk lines and of the local conditions, I beg to recommend that the plans be approved and a permit issued for

the discharge of the sewage from the proposed extensions through the existing trunk sewer into the Niagara river at the foot of Niagara street in the city of Niagara Falls on the following conditions:

1. That whenever required by the State Commissioner of Health satisfactory plans for alterations to the tunnel trunk line in Niagara and Falls streets or for the construction of an additional trunk line or of additional trunk lines designed to provide ample capacity to care for the run-off from the district now tributary to or which may become tributary to the present Niagara street trunk line shall be submitted to this Department for approval.
2. That whenever required by the State Commissioner of Health, satisfactory plans for the preliminary treatment of the sewage of the city shall be submitted to this Department for approval.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *November* 27, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Common Council of the city of Niagara Falls to discharge sewage from the sewer extensions in Second street, 24th street and Buffalo avenue and across the land of the Niagara Falls Power Co. in the city of Niagara Falls into the waters of the Niagara river at the foot of Niagara street within the municipality of Niagara Falls in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That whenever required by the State Commissioner of Health satisfactory plans for alterations to the tunnel trunk line in Niagara and Falls streets or for the construction of an additional trunk line or of additional trunk lines designed to provide ample capacity to care for the run-off from the district now tributary to or which may become tributary to the present Niagara street trunk line shall be submitted to this Department for approval.
4. That whenever required by the State Commissioner of Health satisfactory plans for the preliminary treatment of the sewage of the city shall be submitted to this Department for approval.

M. NICOLL, JR.,
Deputy State Commissioner of Health

December 4, 1917

NORTH HEMPSTEAD (East Williston School)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of the plans for sewage disposal for the East Williston school at Williston, Nassau county,

N. Y., prepared by the Aten Sewage Disposal Co., and submitted to this Department for approval on October 1, 1917.

The school to be served by the proposed plant is located in a sparsely populated district on high ground about 2¾ miles south of Hempstead Harbor. The soil is a sandy loam, well drained, with the ground water level at a considerable distance below the surface. According to the engineer's report, the seating capacity in the school is 140, and the water consumption approximates 1,700 gallons per day. The water supply is taken entirely from the town mains.

The proposed plant comprises a settling tank, dosing chamber and subsurface irrigation field. The sewage will be conducted from the building to the settling tank by a 4-inch tile sewer about 200 feet long. From the settling tank it will flow into the adjacent dosing chamber, and from these be discharged into the subsurface irrigation field.

The settling tank consists of a circular concrete tank located below the surface of the ground having a capacity of about 1,700 gallons giving an average detention period of 24 hours. The inlet and outlet pipes are located at opposite ends of the tank and are turned down about 2 feet below the normal water level.

The dosing chamber immediately adjacent to the settling tank is of similar construction except that it is fitted with a siphon and has a capacity of only 300 gallons. Assuming that the entire flow from the school reaches the tank in 8 hours this chamber will discharge on an average of every 35 minutes during the day. An overflow pipe is provided in the chamber connected to the discharge pipe just below the siphon.

The disposal field is divided into 2 sections either of which may be used at the will of the attendant, a diverting gate being provided, just below the dosing chamber by which he can turn the flow into either section. Each field comprises 8 rows of double 4-inch tile about 125 feet long and 8 feet apart laid at a depth of 18 inches below the surface on a grade of 2 inches per 100 feet. The total length of tile is 2,000 feet or 14 feet per capita. The tile is to be laid with open joints protected by tar paper.

The plans indicate that the minimum grade for sewers connected with the plant will be ⅛ inch per foot. This is a little flatter than desirable for 4-inch tile pipe carrying raw sewage. If possible the line from the school to the plant should be laid on a grade of not less than ¼ inch per foot.

In view of the results of our examination of these plans and a careful study of the local requirements, I beg to recommend that the plans be approved on the condition that the sewer from the building to the tank be laid with a fall of not less than ¼ inch per foot.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 4, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Trustees of the East Williston School to discharge effluent from the proposed sewage disposal works for the school into the waters of the State tributary to Hempstead Bay and its tributaries within the town of North Hempstead in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That both the sewer and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof except as provided in condition 4 of this permit.

4. That the gradient of the sewer from the school house to the disposal plant shall be increased to at least 2 per cent.

M. NICOLL, JR.,
Deputy State Commissioner of Health

October 5, 1917

NORTH HEMPSTEAD (J. J. Murphy)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewage disposal for the property of Mr. J. J. Murphy at Great Neck, town of North Hempstead, L. I., resubmitted to this Department for approval on March 23, 1917.

These plans were first submitted for approval on March 15, 1917. It is found from our preliminary examination of the plans that they were not in satisfactory condition for approval and were, therefore, returned to the designing engineers for modifications. Our examination of the plans now submitted shows that they have been modified in general as recommended.

According to the data submitted with the plans a population of 3 persons is to be cared for. The sewage disposal plant is to consist of a settling tank, dosing tank, and an underdrain subsurface irrigation system. The settling tank is to be a covered reinforced concrete tank provided with 2 manhole openings. It is to be 6 feet long 3½ feet wide and from 4½ to 5 feet deep. It will have a capacity of about 750 gallons equal to about 2 days detention of the sewage, assuming a daily per capita rate of sewage contribution of 100 gallons. The dosing tank is to be 2 feet long 3½ feet wide and is to be provided with an alternating discharge siphon by means of which the effluent from the settling tank is to discharge intermittently into the distributing system of the subsurface irrigation field. The dosing tank has a capacity of about 7½ cubic feet and will, therefore, fill the 4-inch distributing system at each discharge of the siphon.

The subsurface irrigation system is to be located in an excavated area 13 feet wide by 20 feet long. The distributing system is to consist of 3 lines of 4-inch tile 20 feet long each laid with open joints and surrounded with gravel at a depth of about 2 feet below the ground. An underdrained system consisting of 2 lines of underdrains is to be placed at a depth of 3 feet below the distributing system. The filtering material below the distributing system is to consist of 3 feet of mortar sand. The underdrain system is to extend for a distance of 125 feet along and near the steep bank of Long Island Sound opposite the property. This line, however, should be kept at a distance of not less than 20 feet from the top of the bank. The rate of operation of the subsurface irrigation system will be about 50,000 gallons per acre per day on the basis of design used.

From our careful examination of the plans I am of the opinion that the proposed disposal plant should satisfactorily meet the requirements for which it was designed and I would, therefore, recommend that the plans be approved on condition that no part of the underdrain system from the plant shall be located less than 20 feet from the shore of Long Island Sound.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 26, 1917

The plans were approved March 28, 1917.

NORWICH

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of plans for a proposed sewer extension in Berry street in the city of Norwich, Chenango county, N. Y., submitted to this Department for approval by the Common Council of the city on October 26, 1917.

Plans for a comprehensive system of sewers for the village of Norwich were approved by this Department on November 18, 1892. These plans covered all developed portions of the village and provided for the discharge of the sanitary sewage of the village into the Chenango river at the foot of Birdsall street. On April 11, 1906, amended plans showing an additional outlet into the river at the foot of Grove avenue were approved by this Department; and on April 27, 1914, plans providing for still another outlet at the foot of Gold street were approved. It was pointed out to the village authorities at the time of the approval of the last mentioned set of plans, that proper provision should be made by the city for the concentration of its sewage at one point if possible, and for the disposal of such sewage by at least partial treatment.

On June 16, 1915, plans for certain extensions to the sewers in the city to be built in Prospect and Gold streets were approved by this Department. Our report on the examination of these plans discussed the matter of the disposal of the sewage of the city, and pointed out why steps should be taken to provide for at least preliminary treatment of the sewage. The permit issued in connection with the approval of these plans for the discharge of sewage from the proposed extensions into the Chenango river contained the following condition:

> "That on or before October 1, 1916, satisfactory detailed plans for preliminary treatment of the entire sanitary sewage of the city of Norwich by sedimentation accompanied by general plans for additional or supplementary works for more complete treatment of the sewage of the city shall be submitted to this Department for approval and that after approval of said plans such works for preliminary treatment of the sewage shall be constructed and put in operation whenever required by the State Commissioner of Health."

Since that date, plans for extensions to the sewerage system of the city have been approved by this Department and in each case the permit issued in connection with the approval of the plans contained the condition quoted above. The dates on which these permits were issued are August 11, 1915; September 15, 1915, and July 25, 1916.

The detailed plans for a sewage disposal works for the city required by the conditions of the above mentioned permits have not been submitted to this Department for approval; and the common council of the city by a resolution passed on October 23, 1917, now requests that the time for the submission of such plans be extended, stating that

> "they believe it impossible to raise the required funds for the purpose as the city is now bonded for very near its limit of bonded indebtedness, and the amount permitted by the charter to be raised each year by taxation is nearly used up in paying the now existing obligations of the city and its normal running expenses."

The plans under consideration at present contemplate the construction of an 8-inch lateral sewer 250 feet long in Berry street east of Silver street. The grade of the proposed lateral is given on the plans as 0.2 per cent. The upper end of the line is provided with a manhole. This proposed grade is too flat to give a satisfactory self-cleansing velocity, and it would seem desirable to increase the grade to not less than 0.35 per cent. If, however, it is not possible to do this and keep the elevations low enough to admit of future extensions the grade should be increased to at least 0.25 per cent and a flush tank instead of a manhole provided at the upper end of the line.

In view of the above, I would recommend that the plans be approved and a permit issued for the discharge of the sewage from the proposed extension into the Chenango river through the existing outfall sewer in Birdsall street in the city of Norwich with the condition that the grade of the sewer be increased to 0.25 per cent and adequate flushing facilities provided.

I would further recommend that the time for the submission of satisfactory detailed plans for the preliminary treatment of the entire sanitary sewage of the city by sedimentation and general plans for additional or supplementary works for more complete treatment of the sewage of the city be extended from October 1, 1916, to October 1, 1918.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *November* 8, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the common council of the city of Norwich to discharge sewage from the proposed sewer extension in Berry street into the waters of the Chenango river at the foot of Birdsall street extended, within the municipality of Norwich, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That the slope of the proposed sewer shall be increased to not less than .35 per cent or that the slope of the sewer shall be increased to at least .25 per cent and a flush tank instead of a manhole be provided at the upper end of the sewer.
5. That on or before October 1, 1918, satisfactory detailed plans for preliminary treatment of the entire sanitary sewage of the city of Norwich by sedimentation accompanied by general plans for additional or supplementary works for more complete treatment of the sewage of the city shall be submitted to this Department for approval; and that after approval of said plans such works for preliminary treatment of the sewage shall be constructed and put in operation whenever required by the State Commissioner of Health.

M. NICOLL, JR.,
Deputy State Commissioner of Health

November 10, 1917

ORISKANY

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for modifications of portions of the sewer system in the village of Oriskany,

Oneida county, submitted to this Department by the board of trustees on June 8, 1917.

Original plans for a comprehensive sanitary sewer system and for a sewage disposal plant for this village were approved on February 24, 1916, and reference is made to our report dated February 16, 1916, on our examination of these plans for a description of the village and of the sewerage and sewage disposal systems.

Plans now submitted provide for changes of alignment of the sewers in the village near Utica, River and Orchard streets. It appears from the data submitted with the plans that the proposed changes in the alignment of the sewers are to be made owing to the difficulty in obtaining rights of way through private properties through which the sewers, as originally planned, were to be constructed. The proposed changes provide for detours and do not impair the efficiency of the system. In one case it appears that the proposed changes will necessitate the construction of a longer lateral house sewer than would have been necessary had the original plans been carried out. This, however, should not offer any serious difficulty. The size and slopes of the proposed sewers are to be practically the same as originally planned.

In view of the above I would recommend that the plans be approved. It should not be necessary, however, to issue a permit in connection with the approval of these plans inasmuch as they do not provide for any additional discharge of sewage than that contemplated by the original plans.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 22, 1917

The plans were approved June 22, 1917.

OTSEGO COUNTY TUBERCULOSIS HOSPITAL

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of the plans for water supply and sewage disposal for the Otsego County Tuberculosis Hospital, submitted to this Department for approval by the architect on October 14, 1917.

The site of the hospital is in the town of Laurens about 1½ miles southwest of the Mount Vision station of the Otsego and Herkimer Electric Railway, and about 10 miles north of the city of Oneonta. The area of the grounds is approximately 20 acres located on the southerly slope of a hill. The soil is a gravel and loam over shale rock.

Water supply

It is proposed to obtain the water supply for the institution by the development of 2 springs located in the upper part of the property about 1,000 feet from and 100 feet above the building. The area above the springs is sparsely populated, and the quality of the water should be satisfactory from a sanitary standpoint. No measurement has been made of the flow from the springs, but the quantity is estimated at from 10 to 15 gallons per minute, and is said to be nearly constant throughout the year. According to the plans a shallow well or basin about 5 feet square and 4 feet deep will be excavated at the springs to collect the water. This basin has a floor of loose broken stone. The walls are of concrete, the rear wall being perforated with 2-inch holes, 6 inches on centers to permit the entrance of the water. Broken stone and gravel will be filled in behind the perforated wall to prevent the entrance

of earth and other material. The basin is provided with a wooden cover of 2-inch plank. A 6-inch cast iron pipe line conducts the water from the basin to the storage reservoir.

This reservoir is located about 50 feet south of the springs, and has a capacity of 25,000 gallons. It is entirely of concrete and is covered with a very heavy, flat, reinforced concrete roof. The 6-inch supply line enters near the top of the north end and the 4-inch outlet pipe to the hospital is connected through the south end wall a few inches above the floor. An 8-inch blow-off line is connected through the floor near the 4-inch outlet. All of these lines are fitted with shut-off valves housed in concrete manholes just outside of the reservoir. A 20-inch square manhole is provided in the roof near the outlet end and steps were shown on the wall below the manhole to provide means of access to the tank. An overflow opening 12 inches by 8 inches is shown under the roof at the south end of the tank to take care of the surplus water. This overflow or spillway discharges on a small concrete apron located on the ground below it. It would seem that this overflow could be located with advantage on the west side of the tank which is nearer the creek. A still better arrangement would be to provide a stand-pipe overflow inside the tank connected to the 8-inch blow-off line to the brook at a point below the shut-off valve. By this means the unscreened opening in the side of the tank could be avoided. No ventilation is provided for the reservoir, and although closed tanks sometimes prove satisfactory it would seem advisable to provide some means for maintaining a circulation of air over the water in the tank. Ventilation could readily be provided by openings through the roof of the tank. Such openings should be arranged to exclude surface water, and should be screened to prevent the entrance of birds and insects.

A 4-inch cast iron pipe line conducts the water from the reservoir to the hospital. Two double hydrants with 2½-inch outlets are located at the lower end of the line, one hydrant being placed on each side of the building.

Sewage disposal

According to the plans it is proposed to dispose of the sewage from the hospital by sedimentation and subsurface irrigation. The disposal plant is located about 200 feet south of the hospital buildings.

A 6-inch cast-iron pipe conducts the sewage from the building to the settling tank of the disposal works. The grade of this pipe is not given, but it is apparently quite steep; and precautions should be taken in constructing the line to make the rate of fall in the 25 feet next to the tanks not greater than ¼ inch per foot. The settling tank is of concrete, covered, and has a capacity of 1,800 gallons, giving an average detention period of a little over 8 hours with an assumed sewage flow of 100 gallons per capita per day. At the lower end of the tank and integral with it is a dosing chamber fitted with a 5-inch siphon. The capacity of this chamber is 225 gallons, the equivalent of about one hour's average flow. The siphon or dosing chamber discharges into the distributing tank.

This tank is an open concrete basin 3 feet by 5 feet with a stepped floor apparently intended to aerate the effluent from the settling tank. In view of the fact that this chamber is open and located in front of and close to the hospital, particular care should be taken to form and slope the floor so that no sewage will be left exposed to the atmosphere between doses. Two valves are provided at the lower end of this basin by means of which the sewage may be turned into either of the 2 sections of the subsurface irrigation field at the will of the attendant.

Two thousand feet of 4-inch agricultural drain tile laid 18 inches below the surface and divided into 2 sections of equal size are provided to receive the flow from the distributing tank. Each section of the subsurface irrigation field comprises 5 lines of tile 200 feet long laid approximately 4 feet on centers. The tile is laid with open joints, embedded in gravel and the joints protected with tar paper. Assuming a population of 50 people, this gives a

length of 40 feet per capita, a figure considerably smaller than can be recommended for the kind of soil reported as occurring in this location. It would seem advisable with the shaly gravel encountered here to provide at least 60 feet of drain tile for each person living at the hospital.

A sludge bed is provided for drying the sludge from the settling tank. This bed has an area of 250 square feet which appears to be ample for the size of the tank. The bed is 12 inches thick built up of layers of stone and gravel graded from 2-inch stone at the bottom to 1/16-inch gravel at the top. The inlet pipe discharges on a concrete apron about 4 feet square at the upper end of the bed. Six-inch tile drains laid on the bottom collect the effluent and discharge it into 150 feet of subsurface tile laid in the same manner as the tile of the main disposal field. As shown on the plans the pipe connecting the settling tank to the sludge bed is of 6-inch tile laid on a 0.5 per cent grade. On account of the small size and flat grade of this line it is probable that considerable trouble will be experienced in its use due to stoppages; and it would seem advisable to use 8-inch pipe in place of the 6-inch, and to give the line a grade of not less than 2 per cent; and, if possible, of 3 per cent. The valve in the tank at the upper end of this line should be set lower than now shown on the plans so that the bottom of the settling tank will readily drain into the pipe.

In view of the results of our examination of these plans, and after a careful consideration of the essential features of the design and of local conditions, I would recommend that the plans for a water supply for the Otsego County Tuberculosis Hospital be approved with the following conditions:

1. That the overflow from the reservoir be arranged so that the waste water will not cut away the ground near the foundation of the settling tank.
2. That all openings of the reservoir be screened.
3. That suitable ventilation be provided for the reservoir.

I would further recommend that the plans for sewage disposal for the Otsego County Tuberculosis Hospital be approved and a permit issued for the discharge of the effluent of the sewage treatment plant into the tributaries of Otsego creek with the conditions:

1. That sufficient tile be provided in the subsurface irrigation fields of the sewage disposal plant to give a length of not less than 60 feet per capita.
2. That the sludge outlet from the settling tank be set at such an elevation that the floor of the tank will readily drain into it.
3. That the size of the sludge pipe be increased to 8 inches and, if possible, the pipe be laid on a grade of not less than 2 per cent.
4. That the floor of the distributing tank be so formed and sloped that it will drain completely between each dose; and that if required at any time by the State Commissioner of Health the distributing tank shall be fitted with a suitable cover.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 19, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of supervisors of Otsego county to discharge effluent from the proposed sewage disposal plant for the Otsego County Tuberculosis Hospital into the

waters of the State tributary to Otsego creek within the town of Laurens in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That the sewers and sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof except as provided in Conditions 5, 6 and 7 of this permit.
4. That only sanitary or domestic sewage and no surface or storm water from grounds, roofs or other areas shall be discharged into the sewage disposal plant.
5. That sufficient tiling shall be provided in the subsurface irrigation fields of the sewage disposal plant to give a length of not less than 60 feet per capita.
6. That the sludge outlet from the settling tank shall be set at such an elevation that the floor of the tank will readily drain into it; that the size of the sludge pipe shall be increased to 8 inches; that the sludge pipe, if possible, shall have a gradient of not less than 2 per cent.
7. That the floor of the distributing tank shall be so formed and sloped that it will drain completely between each dose; and that if required at any time by the State Commissioner of Health the distributing tank shall be fitted with a suitable cover.

M. NICOLL, JR.,
Deputy State Commissioner of Health

October 22, 1917

OVID (Coleman House)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewage disposal for the Coleman House at Kidders in the town of Ovid, Seneca county, submitted to this Department for approval on April 5, 1917.

According to the data submitted with the plans this hotel which is located on the westerly shore of Cayuga lake, is occupied during the summer months only at which time it accommodates from 50 to 60 people per day. The total population to be served including servants and employees will be somewhat greater. The water supply for drinking purposes is obtained from springs located on a hillside west of the hotel. The water supply for the toilets and baths is pumped from the lake and is said to amount to about 1,100 gallons per day. The soil on the property is claimed to be a heavy red clay to a depth of 4 or 5 feet.

Plans for a sewage disposal plant for this hotel consisting of a settling tank, dosing tank and subsurface irrigation system were first submitted for approval on January 6, 1917. After our careful examination of the plans they were returned without approval to the designing engineer who was advised that in all probability a subsurface irrigation system would not operate satisfactorily in a heavy clay soil and that some other site where the soil is more suitable should be selected or that some other means of disposal of the sewage should be provided. The engineer was also advised that the approval of plans for the treatment of the sewage of the hotel on open or covered sand filters or in sprinkling filters or contact beds with the sterilization of the effluent from the coarse grained filters would be considered.

The plans now submitted show that it is proposed to treat the sewage from the hotel in a sewage disposal plant consisting of a settling tank, dosing tank and open sand filter. It is suggested in the report of the designing engineer that a light removable cover might be provided for the filter or that the filter bed might be sprinkled with chloride of lime or that a liquid mixture of chloride of lime be applied to the siphon chamber of the plant in order to prevent the creation of objectionable odors. A removable cover would in all probability prove satisfactory for this purpose and although there would be no objection to applying a solution of chloride of lime to the dosing tank, chloride of lime should not be sprinkled on the surface of the filter inasmuch as this would tend to clog up the bed and require more frequent cleaning. If a solution of chloride of lime is used it should be applied at a uniform rate.

The settling tank forming the preliminary portion of the plant is to be covered and is to be 11 feet long, 5 feet 3 inches wide and 5 feet deep inside dimensions with a depth of flow of 4 feet. It will have a capacity of about 1,700 gallons and will, therefore, give a detention period of nearly 1½ days with a flow of 100 gallons per day.

The dosing tank which is to be located adjacent to the settling tank is to be provided with an automatic discharge siphon by means of which the effluent from the settling tank will be discharged intermittently to the distributing system of the sand filter. Although the size of the siphon is not given it appears from scale dimensions to be a 3-inch siphon. The average rate of discharge of 3-inch siphons having a draft of 13 inches as proposed is considerably less than 1 cubic foot per second. For a sand filter having as large an area as the proposed filter a siphon having an average rate of discharge of not less than 1 cubic foot per second should be provided in order to insure a satisfactory distribution of the sewage over the surface of the filter bed. This would require a 5-inch or 6-inch siphon depending upon the draft.

The proposed sand filter is to be 26 feet square and is to be filled to a depth of 3 feet with sand having an effective size of from .2 to .4 mm. It is to be provided with 2 lines of underdrains which are to be surrounded with gravel. The joints of the underdrains are to be covered with tar paper. The effluent from the filter is to be discharged into Cayuga lake.

The proposed filter as designed has an area of .015 acres. Based upon the reported flow of 1,700 gallons per day, the rate of operation of the filter would be about 70,000 gallons per acre per day. Although the design of settling tanks is generally based on the actual or estimated flow of sewage, the design of sand filters is governed largely by the organic content of the sewage which is practically the same in the case of sanitary sewage, whether the daily per capita rate of sewage contribution is 20 gallons per day as in this case or 200 gallons per day as in the case of very dilute sewage.

It has been found in practice that open sand filters in use all the year round when treating settled sewage cannot be operated satisfactorily and successfully, except perhaps under expert supervision, at rates of more than 100,000 gallons per acre per day, based on a per capita rate of sewage contribution of 100 gallons per day. It is probable, however, that in the case of the proposed plant which is to be operated only during the summer, the sand filter could be operated at twice the above rate or at a rate of 200,000 gallons per acre per day. This would require an area twice as large as that proposed by the plans in order to care for a population of 60 persons. It would be better, however, to install 2 filters so arranged that either of the 2 filters may be temporarily thrown out of use for resting and cleaning than to increase the size of the proposed filter.

From our careful examination of the plans it is found that the proposed sewage disposal plant has in general been designed to meet the local requirements for sewage disposal. Certain modifications should, however, be made in the plant before it is constructed as indicated above.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge of effluent from the proposed sewage disposal

plant into Cayuga lake in the town of Ovid, Seneca county on the following conditions:

1. That an automatic discharge siphon having an average rate of discharge of not less than 1 cubic foot per second be provided.
2. That an additional filter having an area equal to that of the proposed filter be provided and that these filters be so arranged that either of the two filters may be thrown out of use for resting and cleaning.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *April* 17, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to S. A. Coleman to discharge effluent from the proposed sewage disposal works to treat the sewage of the Coleman House, Kidders, N. Y., into the waters of Cayuga lake near said Coleman House within the town of Ovid in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary sewage and no storm or surface water from grounds, roofs or other areas shall be discharged into the proposed sewage disposal works.
4. That two sand filter units instead of the one shown by the plans shall be constructed, the combined area of these units to be twice the area of the sand filter shown by the plans.
5. That the dosing siphon shall be of such capacity as to provide for an average discharge of not less than 1 cubic foot per second.

M. NICOLL, JR.,
Acting Deputy State Commissioner of Health

April 17, 1917

PHILMONT (School)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for the disposal of sewage from the Philmont school house at Philmont, Columbia county, N. Y., submitted to this Department for approval by the architect on December 1, 1917.

The school building has a seating capacity of 398 and is located on the north side of Main street near the center of the village of Philmont. The property owned by the village and used in connection with the school has a 150 foot frontage on the street and extends from the street to a line parallel to the street about 130 feet in the rear of the school building. It is proposed to locate the sewage disposal plant for the school on the rear portion of this lot. The ground at the site of the disposal plant is a disintegrated shale of a porous nature. Test pits dug on the school property indicate that the soil

is of a uniform character for a depth of at least 6 feet. Neither water nor rock has ever been found in excavations of this depth on the property. Outcrops of soft shale rock with strata vertical are, however, of frequent occurrence in different parts of the village. The surface of the ground is bare and slopes away from the school to the northwest with a fall of about 5 feet per 100 feet. There are no wells on or near the school property and the nearest house to the plot on which it is proposed to construct the disposal plant is over 100 feet from the lot line, the intervening ground being used for garden purposes.

The plans as submitted contemplate the construction of a sewage disposal plant comprising a settling tank, dosing chamber, and subsurface irrigation system divided into two sections.

The settling tank is to be of concrete of 4,000 gallons' capacity furnishing an average detention period of 24 hours, assuming a flow of 10 gallons per capita per day. The inlet pipe enters at one end above the water line and the outlet pipe fitted with a band extending below the water level located at the opposite end conducts the effluent into the dosing chamber. A reinforced concrete baffle is provided at the inlet end to prevent unnecessary disturbance of the contents of the tank, and another similar baffle at the outlet end to prevent sludge and floating material from escaping from the tank. Removable slabs are provided in the top of the tank to give access for inspecting and cleaning.

The dosing chamber is of similar construction to the tank and is located immediately adjacent to it, the south wall of the former forming the north wall of the latter. This chamber has a capacity of about 825 gallons. Assuming that the entire flow from the school reaches the plant in 7 hours this capacity is an equivalent of about 1⅓ hours' average flow during the day. The chamber is fitted with a 6-inch automatic siphon designed and arranged to discharge the contents of the chamber through the diverting manhole into the tile of the subsurface irrigation system.

The subsurface irrigation system comprises 1,952 feet of 3-inch agricultural drain tile divided into two sections of approximately equal size. The tile is to be laid in lines 4 feet on centers with open joints, protected by tar paper and each line is to have a uniform fall of ⅛ inch per foot. The contents in one section of this field is approximately 350 gallons, while as noted above, the discharge from the dosing tank will amount to 825 gallons. Obviously the field will not operate properly under these conditions and either the capacity of the field should be increased by the use of 4-inch tile or the size of the dosing tank decreased so that the cubical content of the tile will be approximately equal to but not less than that of the dosing chamber.

The main distributors are of 6-inch vitrified sewer pipe laid with a fall of ¼-inch per foot. A diverting gate is provided so that the flow can be turned into either field at the will of the attendant.

In view of our examination of these plans and after careful consideration of the essential features of the design and of local conditions, I beg to recommend that the plans be approved and a permit issued for the discharge of effluent from the plant by percolation through the soil into the waters of Claverack creek in the village of Philmont on the following conditions:

1. That only sanitary sewage and no storm or surface water from roofs or other areas shall be admitted to the proposed disposal plant.
2. That the cubic content of the subsurface irrigation field shall be increased or the size of the dosing tank decreased so that the content of one section of the field shall be approximately equal to but not less than that of the dosing chamber and that the size of the dosing chamber be such that the discharge will not occur at intervals of less than one hour.
3. That the settling tank shall be cleaned whenever found necessary and that the sludge be disposed of in such a manner and in such a place as to create no nuisance, and under no condition shall such sludge be discharged or deposited in any watercourse or on the surface of the ground in such a place that it might be washed by rain or melting snow into any watercourse.

4. No liquid from the disposal plant or any pipe line connected therewith shall be allowed to flow upon the surface of the ground.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 1, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Education of the village of Philmont to discharge effluent from the sewage disposal plant into the ground waters tributary to Clavarack creek within the municipality of Philmont in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the water of this State.
3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That only sanitary or domestic sewage and no storm water or surface water from the streets, roofs or other areas shall be admitted to the sewage disposal plant.
5. That the cubic contents of the subsuface irrigation field be increased by increasing the size of the tile or the capacity of the dosing chamber decreased so that the contents of one section of the subsurface irrigation field shall be approximately equal to but not less than the contents of the dosing chamber.
6. That the capacity of the dosing chamber be of such size that it shall discharge not more frequently than once per hour.
7. That the settling tank shall be cleaned whenever necessary and the sludge disposed of in such a manner and at such a place as to create no nuisance, and that under no condition shall such sludge be deposited or discharged in any watercourse or on the surface of the ground at such a place that it may be washed by rain or melting snow into any watercourse.
8. That no liquid from any portion of the disposal plant or from any pipe connected therewith shall be allowed to flow upon the surface of the ground.

M. NICOLL, JR.,
Deputy State Commissioner of Health

December 1, 1917

PITTSFORD (Union Free School)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewage disposal for the Union Free School in the village of Pittsford, Monroe county, submitted to this Department for approval on May 7, 1917.

These plans provide for the disposal of sewage from the school in a sewage disposal plant consisting of a covered two-compartment settling tank, dosing chamber and two cesspools about 25 feet deep and 6 feet in diameter in the bottom of each of which is to be drilled a hole 6 inches in diameter through rock. Owing to the somewhat unusual method of disposal of the sewage provided for by the plans, an inspection of the local conditions was made by a representative of this Department on May 22, 1917, with a view of determining the practicability of providing some other method of disposal.

This inspection showed that the proposed school under construction was being built on the site of the old school which was destroyed by fire last year. The old school was provided with an incinerator for the disposal of sewage which proved to be insanitary and objectionable. The new school which will have a seating capacity of 500 is located near the center of the developed portion of the village on a plot of ground less than two acres in area. The soil consists of a heavy almost impervious clayey soil with layers of blue clay to a depth of some 16 feet, entirely unsuitable for the disposal of sewage by means of subsurface irrigation. The rock below is said to be a shaley limestone. No suitable area for the disposal of sewage from the school appeared to be available within ¾ mile of the school, and the pipe leading to such site would require crossing the Barge canal and a number of railroad tracks.

The village of Pittsford is provided with a public water supply furnished by the Rochester & Lake Ontario Water Company. There are no wells in the village used for water supply purposes and it was learned that all wells were condemned about 10 years ago when the public water supply was installed. Some of the old abandoned wells are now used for the disposal of sewage. There are no public sewers in the village but practically the entire community is provided with cesspools which overflow into wells drilled into the underlying limestone to depths of from 30 to 90 feet. This method of disposal appears to care for the sewage in the village without giving rise to objectionable conditions in the community. It appears that the wells drilled for the disposal of sewage are sunk into the rock substratum until fissures sufficiently large to carry off the sewage are encountered.

Subsequent to the inspection of the village the designing engineer, who is also the president of the board of education, was advised that the proposed method of disposal of sewage at the school is fraught with many uncertainties both from a practical and a sanitary standpoint, and there is no assurance that cesspools drilled into the rock substratum would not become filled when serving a large school, even though this method of disposal might satisfactorily care for the sewage in the village when only one or two families are involved. It was pointed out that the most satisfactory method of disposal of the sewage from the school would be to convey the sewage either independently or in conjunction with the village to a suitable site for complete treatment near some stream and to discharge the effluent into such stream and that the approval of the present plans could be given only on condition that if the proposed method of disposal did not operate satisfactorily some other means of disposal would have to be provided for.

On July 10, 1917, a conference was held in this office with the designing engineer by appointment, when it was learned that the matter of the disposal of the sewage of the school had been given careful consideration at a recent meeting of the trustees of the school and it was decided that the carrying out of plans for discharging the effluent from the disposal plant into a suitable stream would prove too expensive and that the board desired to try to put the proposed method of disposal provided by the plan. The designing engineer stated that the board realized that a permit issued in connection with the approval of the plans would be temporary and that additional or more complete treatment works might be required later.

The proposed settling tank provided for by the plans now before the Department is to be located on the easterly side of the school building and the sewage from the school is to be conveyed to the tank through a comparatively short length of 6-inch sewer laid with a slope of .5 per cent. The settling

tank is to be provided with two compartments so arranged as to permit of operating either or both compartments at one time. Each compartment is to be 24 feet long, 6 feet wide and 8 feet deep, inside dimensions, with a depth below the flow line of 6 feet 4 inches. The tank will provide for a capacity of approximately 13,000 gallons and will give a detention period of about two days with both compartments in operation, assuming a per capita rate of sewage contribution of 10 gallons per day. Each compartment is to be provided with a pipe controlled by a valve leading to one of the cesspools by means of which it is presumably intended to draw off the supernatant liquid from the tank during cleaning.

The plans also provide for a dosing tank with two alternating dosing siphons located adjacent to the settling tank. I am of the opinion that it should not be necessary to provide a dosing tank in connection with the proposed disposal plant, inasmuch as it would be just as well to allow the effluent from the settling tank to flow direct to the cesspool. It would be well also to omit the two pipes referred to above for drawing off the supernatant liquid, inasmuch as if used considerable scum and sludge might be discharged into the cesspool through them and cause it to clog up. The tank which has only a relatively small capacity could be cleaned during the summer vacations by pumping its contents into tank wagons or watertight barrels, by means of which it may be hauled away for disposal. The sludge should not be discharged into any stream or other body of water but should be disposed of by depositing in trenches at sufficient distance from any stream to prevent its pollution and sufficiently far from any building to prevent the creation of any objectionable conditions.

The proposed cesspools into which the effluent from the settling tank is to be discharged are to be operated in series. Each cesspool is to be 6 feet in diameter and is to be excavated to a depth of about 25 feet or until rock is reached. A 6-inch hole is to be drilled through the underlying rock in each cesspool. As pointed out in our communication to the designing engineer on June 20, 1917, that although the proposed settling tank if properly constructed and operated will remove the grosser solids in suspension from the sewage, the more finely divided solids and the collodial matter in suspension in the sewage will be carried over into the cesspool and unless the fissures in the rock are large and lead to some outlet they will ultimately become filled up with solids discharged into them from the settling tank. There is no assurance, therefore, that the cesspools will continue to operate satisfactorily. It is important, therefore, that the cesspools be inspected at regular and frequent intervals and that additional cesspools should be constructed or other means for the disposal of sewage provided should it be found that the proposed cesspools become clogged. It is possible that the solids that may accumulate in the cesspools may be blown out by inserting a large fire stream under pressure into the 6-inch drilled holes of the cesspools in case of clogging.

In view of the above, I would recommend that the plans be approved on the following conditions:

1. That the pipes for draining off the supernatant liquid from the settling tank be omitted.
2. That whenever required additional cesspool or some other satisfactory means of caring for the sewage from the school be provided.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., July 23, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting

chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of the Pittsford High School to discharge sewage from the proposed sewage disposal works for the school into the waters of the State tributary to Irondequoit bay, within the municipality of Pittsford, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That the sewage disposal works shown by the plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That only sanitary or domestic sewage and no storm water or surface water from grounds, roofs or other areas shall be admitted to the proposed sewage disposal plant.
5. That no sewage sludge from any part of the disposal works shall be discharged into any stream or body of water.
6. That whenever required by the State Commissioner of Health additional works for more complete treatment of the sewage from the school shall be constructed and put in operation in accordance with detailed plans satisfactory to this Department.
7. That this permit may be temporarily suspended if the proposed cesspools shall overflow at any time after being put in use unless the sessions of the school shall be discontinued pending the construction of additional works for sewage disposal.

M. NICOLL, JR.,
Deputy State Commissioner of Health.

July 23, 1917

PITTSFORD (General Filtration Co.)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of plans for sewage disposal of the filtros factory of the General Filtration Co., Inc., in the town of Pittsford, Monroe county, submitted to this Department for approval on August 17, 1917.

The disposal plant is to consist of a settling tank and subsurface irrigation field and is designed to care for sanitary sewage only, that is, from the water closets, urinals and lavatories. It is estimated that a maximum of about 25 men will be employed in the factory.

The settling tank is a single compartment tank with baffles, with inlet and outlet located at opposite corners of the tank. It is to be 16 feet long and 8 feet wide with a depth of 8 feet. The capacity of the tank would therefore be about 5,600 gallons, equal to an average flow of sewage of about 11 days on a basis of 20 gallons per capita from 25 persons.

From the settling tank the clarified sewage will flow into a subsurface irrigation field. The plans show no details nor how much subsurface tiling is to be used.

It is found from an examination of the plans that the settling tank is too large for the amount of sewage that it would receive. The daily flow from the toilet fixtures would not be more than 20 gallons per capita and if a maximum of 50 men are employed in the factory a 1,000-gallon tank would be sufficiently large to care for the sanitary sewage from the building. A settling tank of this size would give the sewage about one day's detention. The inlet instead of being on the corner of the tank, as shown on the plans,

could be better located midway of the width of the tank and the outlet be at the opposite end midway of the width so that longitudinal flow would result. The baffles of the tank, as shown on the plans, could be omitted and a baffle placed in front of and 12 inches from the outlet pipe, which would tend to keep the sludge and scum from getting into and clogging the subsurface irrigation system.

The effluent from the settling tank could, in all probability, be satisfactorily disposed of in a subsurface irrigation field of about 500 feet of subsurface tiling laid at a depth of 18 to 24 inches below the surface. The tile should be laid on a gradient of about .5 per cent with open joints covered with tar paper. The subsurface system should be so arranged as to permit the use of half of the system on alternate weeks.

From our careful examination of the plans it would appear that the proposed sewage disposal plant if properly constructed in accordance with the plans and suggestions embodied in this report should satisfactorily care for the sewage from the factory. If it should be found on operation that the subsurface irrigation system is not large enough to properly care for the sewage it appears that there is sufficient area available for extending the system should it be necessary to do so.

I therefore recommend that the plans be approved on the following conditions:

1. That the capacity of the settling tank be reduced to about 1,000 gallons.
2. That the inlet and outlet pipes be located midway of the width of the tank.
3. That the baffle be placed in front of and 12 inches from the outlet pipe.
4. That the subsurface irrigation system be constructed as recommended in this report.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 10, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the General Filtration Company to discharge effluent from the proposed sewage disposal plant for the factory of said company in the town of Pittsford, Monroe county, into the waters of the State tributary to Irondequoit creek within the town of Pittsford in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewers and sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof except as provided in Conditions 5, 6 and 7 of this permit.

4. That only sanitary or domestic sewage and no storm water or surface water from grounds, roofs or other areas shall be admitted to the proposed sewage disposal works.

5. That the capacity of the settling tank shall be reduced to about 1,000 gallons.

6. That the inlet and outlet pipes shall be located midway of the width of the tank and that a baffle shall be placed 12 inches in front of the outlet pipe.

7. That the subsurface irrigation system shall be constructed in the manner recommended in the report of the Chief Engineer on the examination of the plans, a copy of which accompanies this permit.

M. NICOLL, JR.,
Deputy State Commissioner of Health

September 10, 1917

PORT JERVIS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for proposed sewer extensions in the city of Port Jervis, Orange county, submitted to this Department for approval by the common council on April 4, 1917. Application for approval of the plans was received on April 13, 1917.

The city of Port Jervis is situated in the southwestern part of Orange county near the confluence of the Neversink and Delaware rivers. The records of the Department show that plans for a comprehensive sewer system for the then village of Port Jervis were approved in 1891. These plans provided for the discharge of sewage from the village into the Delaware river at 3 different points, and for the discharge of sewage into the Neversink river near East Main street. On November 16, 1899, plans for the extension of the main outfall sewer to a point about 500 feet farther down stream were approved. No plans for sewerage for Port Jervis have been submitted to or approved by this Department.

On October 24, 1916, an investigation of the sewerage conditions of the city of Port Jervis was made by a representative of this Department as the result of complaints of insanitary conditions in the southern part of the city due to the lack of proper sewerage facilities. This investigation showed that very insanitary conditions, caused by the overflow of cesspools, existed in East Main street between Cole street and Jersey avenue, and it was recommended to the city that a sewer be constructed in this portion of Main street in order to remedy these conditions.

The plans now submitted provide for comparatively short sewer extensions in East Main street and West Main street tributary to existing outfall sewers. The proposed sewer in East Main street is to be 8 inches in diameter and is to extend from Cole street to Jersey avenue, a distance of 840 feet. The upper section of the sewer is to be constructed with a slope of 1.00 per cent and the lower two sections are to be laid on slopes of .57 per cent. A manhole is to be constructed at each point of change of slope and alignment at the upper end of the proposed sewer and at its junction with the existing sewer. The sewage to be collected by this sewer is to discharge into the upper end of the existing sewer in East Main street at Jersey avenue, which empties into the Neversink river near the East Main street bridge.

The proposed sewer in West Main street is to extend from the upper end of the existing sewer between Lyman and Francis streets to a point a short distance north of Harold street, a distance of 760 feet. This sewer is also to be 8 inches in diameter. The upper section of the sewer is to have a slope of .6 per cent and the lower section a slope of .5 per cent. Manholes are to be constructed at the upper end of the sewer at its junction with the existing sewer and at a point about midway between the upper and lower ends of the

sewer. The sewage to be collected by this sewer is to discharge into the Delaware river through the existing outlet near the foot of Ferry street extended.

From our careful examination of the plans, it is found that the proposed sewers, if properly constructed, should satisfactorily care for the sanitary sewage of the sections to be served by them, and I would therefore recommend that the plans be approved and a permit be issued allowing discharge into the Neversink and Delaware rivers and sewage to be collected by the proposed sewers.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *April* 30, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the common council of the city of Port Jervis to discharge sewage from the proposed sewer extension in East and West Main streets into the water of Delaware and Neversink rivers through existing outlet sewers within the municipality of Port Jervis in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

M. NICOLL, JR.,
Deputy State Commissioner of Health

April 30, 1917

RAMAPO (Ramapo Finishing Corporation)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of the plans for the disposal of the wastes from the proposed plant of the Ramapo Finishing Corporation to be located at Sloatsburg, Rockland county, N. Y., submitted to this Department for approval by the attorney of the corporation on November 10, 1917.

The factory buildings are to be erected between the Orange turnpike and the Ramapo river in the town of Sloatsburg about 3½ miles north of the village of Suffern. A small creek tributary to the Ramapo river, known as Nakama brook, receives the drainage from the property. This brook empties into the river about ½ mile below the proposed site of the works. The watershed of the brook is small but the flow is supplemented by a considerable quantity of water from a mill race which takes its water from the Ramapo river at a dam just above the site of the proposed plant. The Ramapo river at the point where the Nakama brook discharges, has a drainage area of about 80 square miles and an estimated dry weather flow of about 8 cubic feet per second.

The corporation proposes to engage in the bleaching, finishing and printing of cotton and other fabrics and cloths; and intends to employ the coloring matter, print colors and bleaching material generally used in connection with such work. According to the report of the chemist of the corporation, the quantity of trade waste from the plant will be approximately 120,000 gallons per day made up of the waste liquor from the kiers after boiling, the wastes from the soaping machines, and the wastes from the dyeing and padding machines. An analysis made by the chemist of a mixture of wastes, combined as near as possible in proportion to the quantity of each expected from the Ramapo plant, gives the following results in parts per million:

	In solution	In suspension	Total
Organic matter	4,395	225	4,620
Inorganic matter	10,070	750	10,820
Total solids	14,465	975	15,440

The organic matter was very largely red oil soap, coloring matter, dye stuffs, wood extracts and small quantities of oil, cotton threads and waxes. The inorganic matter consisted mainly of sodium salts (phosphate, sulphate, chlorate and carbonate), and iron and chromium salts (mainly acetates) together with some calcium salts and some silicates. The total quantity and the proportion of the different solids will vary from day to day, depending upon the operations carried on at the works. Experiments with the wastes seem to indicate that only about 3½ per cent (520 parts per million) of the solid matter can be removed by a reasonable period of plain sedimentation; but that nearly all of the organic matter can be precipitated by the application of lime. The quantity of lime required for the complete precipitation of the organic matter when the waste liquid has the composition given above, is about 1,500 parts per million. It is probable, however, that in the practical operation of a plant for the clarification of such wastes the application of a smaller quantity than this will give a satisfactory effluent. The quantity applied, of course, would have to be regulated to suit the composition of the wastes.

The sanitary sewage to be cared for will be that from the different toilets and wash rooms in the factory buildings. About 100 men will be employed at the works, and it is estimated that the sewage flow will be approximately 2,000 gallons per day.

The plans submitted contemplate the construction of a sewage disposal plant to treat both the trade wastes and the sanitary sewage from the works. These two kinds of sewage will, however, be collected by entirely separate systems of sewers, and treated differently in separate tanks. The only portion of the disposal plant to be used in common for both being the sludge beds.

It is proposed to treat the trade wastes from the works by precipitating the solids with lime. For this purpose two concrete settling tanks are provided, each 100 feet long, 20 feet wide and 9 feet deep. The bottoms of the tanks are formed into hoppers to facilitate the removal of the sludge. Two sides of each hopper have slopes of 1 to 1 and the other 2 slopes of 1 vertical to 2 horizontal. An 8-inch sludge pipe connects the bottom of each hopper to the sludge trough which passes between the 2 tanks and leads to the sludge beds. The sewage enters each tank above the flow line at the center of one end, and is drawn off by a 12-inch outlet pipe at the opposite end located at such an elevation that its center line is 3 feet below the top of the tank. The outlet ends of the tanks are provided with baffles to prevent floating materials from passing out.

Two 2,280 gallon lime tanks are provide at the inlet end of each tank for applying the lime to the sewage. The settling tanks are to be constructed of concrete and covered with a 1-story frame building. A 12-inch sewer will conduct the sewage to the tanks.

Eight sludge beds are provided for drying the sludge. Each of these beds has an area of 5,000 square feet. The beds are to be 3 feet thick built up of 12 inches of 2 inch gravel, 12 inches of ½-inch gravel and 12 inches of sand of a size that will pass through a ⅛-inch screen. Wooden troughs are provided for distributing the sludge over the beds, and tile underdrains for carrying off the effluent.

The settling tanks are to be operated on the fill and draw plan using the upper 3 feet of each tank in turn. The outlet valve of 1 tank will be closed and the entire flow of sewage admitted at the opposite end of that tank until it is filled. Lime will be applied to the sewage as it enters the tank in the form of milk of lime from the lime tanks mentioned above. When the tank is filled the flow will be turned into the second tank and the first tank allowed to stand full while the second is filling. Just before the second tank is full, the outlet valve at the first will be opened and the upper 3 feet of the clarified liquid drained off and discharged into Nakama brook. The valve will then be closed, the flow again turned into the first tank, and the second tank allowed to stand full while the first is filling.

Assuming that the total daily flow of 120,000 gallons reaches the plant in 10 hours, the time required for filling the upper portion of 1 tank (44,800 gallons) will be about 3 hours and 40 minutes. This gives, allowing a reasonable time for drawing off the clarified liquid, an average period of about 3 hours for the settlement of the solids which appears to be ample for sewage treated in this manner.

From the data given above, it seems that the quantity of lime required will be about 1,000 parts per million varying with the strength of the sewage. The amount required each time a tank is filled will, therefore, be about 350 pounds. Unless the lime tanks are to be recharged during the filling, this means using a lime solution of about 1 pound to 16 gallons of water, a concentration very difficult to handle. It would appear advisable, therefore, that the lime tanks should be provided with some form of agitators to keep the lime in suspension and secure a uniform rate of application.

At such times as may be necessary the quick opening valves on the sludge pipes of one of the tanks will be opened while the tank is full, and the sludge drained off to the sludge beds. Assuming the sludge to contain 92 per cent of moisture, each sludge bed, filled to the depth of 1 foot, will take about 5 days accumulation of sludge. Allowing a reasonable time for removing the sludge and restoring the beds, this will give a drying period of about 35 days, an ample time to reduce the sludge to a spadeable condition under favorable conditions; but not enough to produce satisfactory results under weather conditions that are likely to prevail during the winter months. The handling of the sludge at such times may involve considerable expense; and it would seem advisable, before the sludge beds are constructed, for the corporation to consider the installation of sludge drying apparatus similar to that used at several large plants where sewage is treated with lime and other chemicals. The engineer's report does not state how the dry sludge will ultimately be disposed of, but it is assumed that it will be dumped on land so located as not to cause any nuisance.

The sanitary sewage will be collected by a separate 6-inch sewer, and conducted to a concrete settling tank adjacent to the larger tanks described above and similar to them in construction. As shown on the plans this tank has a capacity of 10,500 gallons giving an average detention period of about 5 days. This period is considerably longer than is generally considered desirable for the treatment of sewage of the character that will be received here, and the size of the tank should be so reduced as to give a detention period of not over 24 hours. It is proposed to operate this tank continuously, and to apply chloride of lime to the sewage as a disinfectant. The outlet has accordingly been set at the level of the flow line in the tank.

A tank of 1,400 gallons capacity is provided for preparing and applying the chloride of lime solution to be used to treat the sanitary sewage. While no details are furnished showing the exact method of applying chloride of lime, it appears from the drawings that it is intended to allow the solution to run directly from the solution tank into the incoming sewage. This method

has generally been found unsatisfactory where a uniform rate of application has been desired, and it would appear advisable to install 2 mixing tanks so that one can be used while the solution is being prepared in the other, and to provide a constant level orifice tank for regulating the rate of application of the solution to the sewage. Chloride of lime can readily be handled in solutions of 1 pound to 30 gallons of water, and the mixing tanks, therefore, need not be as large as shown on the plans.

Care should be taken to so locate these tanks as not to interfere with the cleaning of the sludge pipe. As now indicated on the plans the chloride of lime tank is located directly over the riser from one of the sludge hoppers, making it impossible to clean that sludge pipe without moving the tank. The effluent from the tank will be discharged into the Nakama brook through the same pipe that will carry the effluent from the chemical precipitation tanks. The sludge pipes are arranged to discharge on to the sludge beds described above and the sludge when drawn off will be cared for in the same manner as that from the larger tanks.

In view of the results of our examination of these plans and after careful consideration of the essential features of the design and the proposed method of treating the wastes and sewage, I beg to recommend that the plans be approved and a permit issued for the discharge of the effluent from the disposal works into the waters of Nakama brook in the town of Sloatsburg, Rockland county, on the following conditions:

1. That the quantity of lime used for the precipitation of the solids in the trade wastes shall be regulated according to the composition of the wastes, and shall always be sufficient to satisfactorily remove the organic and suspended solids, and produce a clear and nonputrescible effluent.
2. That the lime tanks be arranged so that the lime may be readily applied uniformly and continuously while the wastes are entering the settling tank.
3. That the size of the settling tank for the sanitary sewage be reduced to provide a detention period of not less than 12 nor more than 24 hours.
4. That the hypochlorite of lime used for treating the sanitary sewage be applied in such quantity as to give a rate of application of not less than 15 parts of available chlorine per million parts of sewage.
5. That the apparatus used for applying the hypochlorite of lime solution shall be constructed and arranged to apply the solution continuously and at a uniform rate, and so located as not to interfere with the cleaning of the sludge pipes.
6. That the sludge be finally disposed of in a manner that will not cause any local nuisance, and that if found necessary, means other than drying by exposure to the air shall be used in reducing the water content of the sludge.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *November* 20, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given the Ramapo Finishing Corporation to discharge effluent from the disposal plant to be constructed at their works near Sloatsburg into the waters of Nakama brook near the works of said company within the town of Ramapo in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That the quantity of lime used for precipitating the solids in the trade wastes shall always be sufficient to satisfactorily remove the visible suspended solids and produce a clear effluent.

4. That the lime tanks shall be arranged so that the lime may be readily applied uniformly and continuously as the wastes enter the settling tanks.

5. That the size of the settling tank for the sewage shall be sufficient to provide for a detention period of not less than 12 hours nor more than 24 hours.

6. That the hypochlorite of lime used for treating sanitary sewage shall be applied uniformly to the wastes in the proportion of not less than 15 parts of available chlorine per million parts of sewage treated.

7. That the apparatus used for applying the hypochlorite of lime solution shall be so constructed and arranged as to apply the solution continuously and at a uniform rate and so located as not to interfere with the cleaning of the sludge pipes.

8. That the amounts of chemicals used in the purification processes shall be increased or diminished from time to time whenever required by the State Commissioner of Health.

9. That the sludge shall be finally disposed of in a manner that will not create a nuisance and that if found necessary means other than drying the sludge by exposure to the air on sludge beds shall be used in reducing the water content of the sludge.

M. NICOLL, JR.,
Deputy State Commissioner of Health

November 27, 1917

RAVENA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for proposed sewer extensions in the village of Ravena, Albany county, submitted to this Department for approval by the board of trustees on March 13, 1917.

Original plans for a comprehensive sanitary sewer system for the village and for the sewage disposal plant, consisting of a screen chamber, preliminary settling tank of the Imhoff type, sprinkling filter, secondary settling tank, also of the Imhoff type, and a chlorination plant, were approved on February 15, 1915. On February 16, 1915, a permit was granted to the board of trustees for the temporary omission from construction of certain sewers and of the sprinkling filter, secondary settling tank and chlorination plant. The sewer system and sewage disposal plant have been constructed and are now in operation. The effluent from this disposal plant empties into Onisquethau creek, which discharges into the Hudson river above the unincorporated village of Coeymans.

The plans now submitted show that it is proposed to construct sewers in Wendell and Bradwell streets, in Jefferson and Orchard avenues and in Russell avenue extended, in the Cowie extension. All of these sewers are to be tributary to existing sewers and to the village sewage disposal plant.

The proposed sewers are to be 8 inches in diameter and are all to be constructed on fairly steep slopes. Manholes are to be installed at the upper ends of the sewers and at all points of change of slope and alignment.

From our careful examination of the plans it is found that the proposed sewers if properly constructed should satisfactorily meet the needs for which

they were designed and should be of adequate size and capacity to care for the probable maximum rate of flow of sanitary sewage tributary to them.

I would therefore recommend that the plans be approved and a permit issued allowing the discharge of sewage from the proposed sewers into Onisquethau creek after such sewage shall first have been passed through the village sewage disposal plant.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 26, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of Chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of the village of Ravena to discharge sewage from the proposed sewer extensions in Wendell and Bradwell streets, in Jefferson and Orchard avenues and in Russell avenue extended into the waters of Coeymans creek through the outlet of the village sewage disposal plant within the town of Coeymans in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That all the sewage to be collected by the proposed sewers shall be passed through the village sewage disposal plant.

LINSLY R. WILLIAMS,
Deputy State Commissioner of Health

March 28, 1917

RENSSELAER

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to sumbit the following report on our examination of revised plans for a proposed sewer in Grove street in the city of Rensselaer and for the treatment of the sewage to be collected by this sewer in a settling tank before its discharge into Mill creek. These plans were submitted by the city engineer on behalf of the common council on June 1, 1917.

Plans for a proposed sewer in Grove street and High street discharging into the existing sewer in Third avenue were approved by this Department on September 7, 1916. According to the data submitted with the present plans, a sewer is not needed at this time in High street, and in order to carry out the approved plans it would be necessary to tear up some 850 feet of new bituminous macadam road and to excavate through rock for a distance of over 800 feet. It is proposed therefore to temporarily omit the construction of the sewer in High street from the manhole a short distance below the dam at Mill creek and to temporarily treat the sewage from the Grove street sewer

in a settling tank to be located between High street and the creek, a short distance below the dam. Mill creek at this point has a drainage area of some 15 square miles.

According to the report of the city engineer, there are at present only 3 houses in Grove street that would use the sewer, and there will not be more than 8 houses on this street within the next generation. The population to be cared for will therefore vary from 15 to 40 persons, assuming a population of five per house.

The proposed sewer in Grove street is to have the same slopes and grade as originally planned, so that it will be possible at any time in the future to extend this sewer down High street to Third avenue as originally planned. The sewer is to be 8 inches in diameter and will have slopes of from 8.15 per cent to 4.5 per cent.

The settling tank is to be a covered concrete tank 10 feet long, 5 feet wide and 6 feet deep, inside dimensions, with a depth below the flow line of 5 feet. The tank will therefore have sufficient capacity to care for a population of from 50 to 60 persons, assuming a per capita rate of sewage contribution of 100 gallons per day. No water supply is taken from the Mill creek below the outlet of the proposed settling tank.

From our careful examination of plans, I am of the opinion that the proposed sewer and disposal settling plant should satisfactorily care for the sewage for the limited population on Grove street. I would therefore recommend that the plans be approved and a permit be issued allowing temporarily the discharge of effluent from the proposed settling tank into Mill creek, and I would further recommend that the permit contain, in addition to the usual revocation and modification clauses, the condition that whenever required by the State Commissioner of Health plans for supplementary or more complete treatment of the sewage to be collected by the Grove street sewer shall be submitted or that the settling tank be abandoned and the sewer in High street tributary to the proposed sewer in Third avenue be constructed and the sewage from Grove street diverted into the High street sewer as originally planned.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, *June* 2, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the common council of the city of Rensselaer to discharge sewage from the proposed sewer extension in Grove street into the waters of Mill creek near the intersection of Grove street and High street within the municipality of Rensselaer in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage and no storm or surface water from streets, roofs or other areas shall be admitted to the proposed sewer and settling tank.
4. That all the sewage to be collected by the proposed sewer shall be passed through the settling tank shown by the plans.

5. That whenever required by the State Commissioner of Health additional works for more complete treatment of the sewage shall be constructed and put in operation or the necessary sewers to convey the sewage to be collected by the proposed sewer to the city sewer system shall be constructed and the discharge of sewage or sewage effluent at the point now proposed discontinued.

M. NICOLL, JR.,
Acting Deputy State Commissioner of Health

June 6, 1917

RENSSELAER COUNTY TUBERCULOSIS HOSPITAL

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for water supply and sewage disposal for the Rensselaer County Tuberculosis Hospital submitted to this Department for approval on June 20, 1917.

The tuberculosis hospital is to be located near Wynantskill, in the northeastern part of the town of North Greenbush. According to the data submitted with the plans, the institution will have a total population of about 250, including patients, officers and employees.

Water supply

The water supply is to be derived from driven wells located about 150 feet from a pond in the eastern portion of the property. From a well driven at this site it is found that the soil at that point consists of 2 feet of top soil, 30 feet of gravel, 45 feet of hardpan and clay, 1 to 3 feet of fine sand and 10 to 12 feet of shale rock. The water of this well was found to stand at an elevation of 6½ or 7 inches above the water surface in the pond, showing that the ground water table at the well is that much above the water surface of the pond.

Although wells driven at this point should produce water of a satisfactory sanitary quality, no tests have as yet been made as to the yield of these wells, but it is probable that sufficient water can be obtained from two or more wells to meet the needs of the institution. Valves are to be placed on the suctions of each well to permit of shutting off either well and to control the draft on the wells.

The water from the wells is to be pumped to an elevated water tank having a capacity of 100,000 gallons to be located at an elevation of about 20 feet above ground and about 60 feet above the foundations of the buildings located farthest up hill. The specifications include alternate bids for a 60,000 gallon tank. The pumps are to consist of triplex pumps having a capacity of 85 gallons per minute each against a head of 200 feet. These pumps are to be driven by an electric motor and an auxiliary gas engine either of which can be made to drive either of the two pumps.

The water is to be pumped from the wells to the elevated water tank through some 2,800 feet of 4-inch pipe and about 200 feet of 6-inch pipe which will supply the main distributing system of the institution which is also to consist of 4-inch pipe. Hydrants are to be provided at various points near the buildings and a blow-off is to be placed on the main at a low point near one of the men's pavilions.

Sewage disposal

The sewage disposal plant is to consist of a settling tank and subsurface irrigation system. The settling tank is to be divided into two compartments and is to be so arranged as to permit of shutting off the flow of either compartment without disturbing the flow through the other compartment. The tank is to be covered and is to be provided with manholes and submerged out-

lets. The tank will have a total capacity of about 22,000 gallons, equal to nearly one day's flow of sewage when serving a population of 250 and assuming a per capita rate of sewage contribution of 100 gallons per day. The sludge is to be disposed of on a sludge drying bed 27 feet square by 2 feet deep to be located some 300 feet from the settling tank. The sludge pipe is to be 6 inches in diameter and will have an average slope of about 5 per cent. The bed is not to be provided with underdrains and it does not appear necessary to drain the bed owing to the porous nature of the soil which is claimed to be of a gravelly loam.

The subsurface irrigation system is to consist of a main distributing trough and 42 lines of lateral distributors 200 feet long each, giving a total of nearly 9,000 feet of tiling or about 36 feet of tile per person served on the basis of design used. The distribution system will cover an area of nearly one acre and will, therefore, provide for a rate of operation of approximately 25,000 gallons per acre per day.

The main distributing trough is to be provided with baffles located below each of two sets of lateral distributors so that it will be necessary to fill two upper lines of distributors before effluent will flow over the baffle into the next set of two lines of distributors. These baffles are removable so that it will be possible to shut off the flow to the various lines of distributors by removing the different baffles.

The lateral distributors are to consist of 3-inch agricultural tile, laid with slopes of 4 inches in 100 feet at a depth of about 18 inches below the surface of the ground. The tile are to be laid with open joints and the joints are to be covered with tar paper. According to the data submitted with the plan the soil is of a loose gravelly nature and should be well adapted to the disposal of sewage by means of subsurface irrigation. There appears also to be adequate area available for the extension of the system if necessary in the future. The field, moreover, appears from the topography to be so located that there should be little or no opportunity for the pollution of the wells which are to be situated about 900 feet from the disposal plant and beyond a rise in the ground.

It is noted from the specifications for plumbing that lavatories with no plugs at the outlets are specified. This would in all probability give rise to considerable waste of water and does not appear to be necessary.

From our careful examination of the plans I am of the opinion that the proposed water supply and sewage disposal system if properly constructed in accordance with the plans and if operated with care and efficiency should satisfactorily meet the requirements for which they were designed, and I would, therefore, recommend that the plans approved.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 20, 1917

The plans were approved July 11, 1917.

ROCKVILLE CENTER (Clinton School and South Side H. S.)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for the disposal of sewage from the Clinton School and the South Side High School at Rockville Center, Nassau county, submitted to this Department for approval on July 17, 1917.

The records of the Department show that the plans for the disposal of sewage by means of a cesspool for the Clinton School in the village of Rockville Center were submitted to this Department for approval through the State Education Department in August, 1916. The Education Department was advised that it appeared from our examination of the plans that the

sewage disposal plant provided for by the plans would be inadequate to care for a large school, and it was pointed out that better results and greater security of permanent satisfactory operation would be obtained by constructing a disposal plant consisting of a settling tank and subsurface irrigation system.

The plans for the disposal of sewage for the Clinton School and South Side High School at Rockville Center in cesspools were first submitted for approval on July 6 of this year. No data were submitted with the plans as to the nature of the soil and the population to be served by the school, but it was apparent from the number of toilet fixtures shown by the plans that the attendance at the schools would be large and it did not appear that cesspools would satisfactorily care for the sewage from schools as large as those indicated by the plans. They were therefore returned with the recommendation that some other means of disposal, such as subsurface irrigation, be provided for.

We were subsequently advised by the principal of the Rockville Center public schools on July 12 that the Clinton school is located in the center of the village near the middle of a plot of ground 300 feet long by 200 feet wide, and that the area available for the disposal system is only about 100 feet. It was stated that the locations of the toilet rooms, which will be used by about 600 pupils, are so low that the sewer where it emerges from the building will be about 7½ feet below the surface of the ground, making it impracticable to install a subsurface irrigation system.

With respect to the South Side High School it was stated that this school was located on the plot of ground about 200 feet long by 175 feet wide, and that about 200 pupils are to be provided for at this school. The sewer at the building will also be about 7 feet below the surface of the ground. It was stated that there are no wells in the village and that the soil is sandy. It appears that the sewage from one of the school buildings in the village is satisfactorily disposed of by means of cesspools and that there are a number of other large schools in that section of Long Island which use cesspools for the disposal of sewage.

After a careful consideration of the above data the principal of the school was advised that under the circumstances it would seem advisable to attempt to dispose of the sewage from the schools by means of cesspools rather than by means of subsurface irrigation systems, as previously recommended. It was recommended that 4 cesspools each 10 feet in diameter and 10 feet deep below the flow line be provided for the Clinton school and 2 cesspools for the South Side High school, and that the walls of the cesspools should be constructed of hollow tile or hollow brick filled with sand, so that in case of clogging the sand in the tile may be withdrawn and new sand placed in the hollow tile or brick.

The plans now submitted provide for 3 cesspools about 10 feet deep and 10 feet in diameter for the Clinton School to be operated in series and 2 similar cesspools for the South Side High School also to be operated in series. The cesspools according to the plans are to be constructed of ordinary red brick, every sixth course of which is to be laid in cement mortar.

It appears, therefore, that the recommendations of our letter of July 15 have not been fully complied with in that only 3 cesspools are to be provided for the Clinton School in the place of 4 as recommended, and that the cesspools are to be constructed of ordinary brick in place of hollow brick or hollow tile.

It is highly important that special care should be taken in the construction of the cesspools at these schools owing to the large population to be served and the considerable quantity of sewage to be cared for in order to give reasonable assurance that the cesspools will not prove unsuccessful and that overflowing of them will not result thereby, necessitating the construction of additional works for the treatment of the sewage. Not less than 4 cesspools should be provided for at the Clinton School and all except the first cesspools into which the sewage from the toilets is discharged should be so arranged as to permit of throwing either one of the cesspools out of use

in case of clogging. The manholes of the cesspools should also be carried to the surface of the ground and provided with manhole covers in order to permit of regularly inspecting the cesspools and in order to give an opportunity to construct additional cesspools or additional works for the treatment of the sewage should the cesspools first constructed prove to be inadequate.

In view of the above, I would recommend that the plans be approved on the following conditions:

1. That not less than 4 cesspools be provided for at the Clinton School and that these cesspools be so arranged as to permit of throwing one or more of the cesspools out of use for resting if necessary.
2. That the cesspools be constructed with hollow brick or hollow tile.
3. That whenever necessary or required additional cesspools or additional works for the treatment of the sewage of the school shall be provided.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July* 23, 1917

The plans were approved July 23, 1917.

ROCKVILLE CENTER (St. Agnes School)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of the plans for sewage disposal for the St. Agnes Parochial School at Rockville Center, Long Island, N. Y., submitted to this Department for approval on October 17, 1917.

The proposed disposal systems, which will consist of 2 separate series of 2 cesspools each, are to treat the sewage from 4 flush closets and 8 urinals in the boys' toilet and the other system will treat the sewage from 8 flush closets in the girls' toilet. The soil in the vicinity of the school house is sandy and it is stated that from the surface of the ground to the ground water level there is at least 20 feet of fine sand. There are no wells within ½ mile of the proposed cesspools and the nearest residence is about 80 feet distant.

The sewage from each of the toilets is to be conveyed to the first leaching cesspool through about 35 feet of 6-inch vitrified pipe laid on a slope of about 5.7 per cent. This cesspool which is to be circular in plan, is to be 12 feet in diameter and will have a depth of about 11 feet below the intake pipe, giving a capacity of about 8,500 gallons. The wall of the cesspool is to be of hollow tile so that the sewage may leach out into the surrounding sandy soil. The top of the cesspool is a brick and cement dome having a manhole opening. It appears from an examination of the plans that there is to be no bottom constructed for the cesspool, so that the sewage may also leach through the soil at the bottom.

There is an overflow pipe from this first cesspool through which the excess sewage effluent is to be conveyed to the second leaching cesspool, this pipe consisting of about 25 feet of 6-inch vitrified tile. This second cesspool is to be constructed in the same manner as the first cesspool described above.

We have found that in disposing of the sewage from institutions of this size, and where the nature of the soil permits, as it does in the vicinity of the school in question, that a more suitable method of disposing of the sewage is by the use of a settling tank and subsurface irrigation system. However, since the sewer pipes as they leave the toilet rooms are laid at a depth of 5 feet below the ground surface, and enter the cesspools at a depth of 7 feet below the ground surface, it would be difficult to intall a system of subsurface irrigation for disposing of the sewage since it would be impossible to deliver the sewage in lateral or distributing tiles laid near the surface of the ground without resorting to pumping.

In view of the above conditions I therefore recommend that the plans be approved.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 20, 1917

The plans were approved October 22, 1917.

RYE (A. C. Gwynne)

Plans for the disposal of the sewage from the property of Mr. A. C. Gwynne at Rye, Westchester county, N. Y., were submitted to this Department for approval on December 28, 1916. These plans provide for the construction of a sewage disposal plant consisting of a settling tank, a dosing chamber, and a covered sand filter. The effluent from the sand filters is to be discharged into Long Island Sound.

The plans were approved and a permit issued for the discharge of the effluent into Long Island Sound on January 12, 1917.

SAUGERTIES (Thomas Cochran farm)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the examination of the plans for improvements in the method of sewage disposal at the Thomas Cochran or Gray Mouse farm in the town of Saugerties, near Kingston, Ulster county, N. Y., submitted to this Department for approval by the designing engineers on August 6, 1917. Additional information regarding the plans was submitted to the Department on August 30, and October 20, 1917.

The Thomas Cochran farm is located on the west bank of the Hudson river, 8 miles north of Kingston, and consists of a narrow strip of land about 1,000 feet wide, extending from the bank of the river for a little over a mile and a half in a westerly direction. The soil is a clay overlying shale and limestone rock which outcrops at several points.

During the summer months, the farm is used by the New York City Association for the Improvement of the Condition of the Poor as a fresh air home for 40 girls; and from June to October the total population is approximately 50 persons. During the winter, only the caretaker and his family live on the property.

The buildings consist of a dormitory, farm house, laundry and several barns and sheds. The dormitory is occupied by 21 children and their attendants, and is provided with running water and plumbing fixtures. The sewage from this building is at present treated by a sewage disposal plant consisting of a sedimentation tank, dosing chamber and sand filters. The sedimentation tank is a covered masonry structure of 1,000 gallons capacity and provides an average detention period for the sewage of about 12 hours. A dosing chamber of 300 gallons capacity adjoins this tank, into which the effluent from the tank flows and from which it is discharged by a 3-inch siphon onto the sand beds. The arrangement of the tank outlet is such that each discharge of the dosing chamber draws the tank down several inches giving a dose of about 500 gallons, a quantity equivalent to a depth of approximately 1¼ inches on one sand bed. A diverting gate is provided by which the attendant can turn the dose onto either of the two sand beds at will. Each of these sand beds has an area of 0.015 of an acre making a rate of filtration with both beds in use about 70,000 gallons per acre per day. The depth of the beds is

3 feet, and by the effective size of the sand 0.35 mm. The sewage is distributed on the beds by perforated iron troughs; and the effluent collected by tile underdrains, and discharged into a branch of the farm ditch about 300 feet southeast of the dormitory. The engineers' report states that the plant is in good condition and operating satisfactorily.

The farm house has a population during the summer months of 22 persons and like the dormitory, is provided with running water and plumbing fixtures. The sewage from this building flows to a closed concrete tank of 800 gallons capacity, giving an average detention period of about 6½ hours. The effluent from the tank passes through a subsurface charcoal filter, and from this filter is discharged into the farm ditch. No details of the charcoal filter have been furnished and the engineers' report states that the use of this filter is to be abandoned.

The laundry is at present not supplied with running water. All the water used for laundry purposes being carried by hand from a nearby well. The wastes from the building are discharged on the top of the ground.

According to the plans and the engineers' report it is proposed to make the following improvements in the method of sewage disposal at the farm.

A 6-inch vitrified pipe sewer is to be laid from the laundry to the sedimentation tank serving the dormitory. This line will be 550 feet long, and is to be laid on a grade of 0.5 per cent. There is one bend in this line, and a manhole is provided at this point. If running water is installed at the laundry as intended, the additional quantity of sewage that will be conducted to the dormitory sedimentation tank by this line will probably reduce the detention period of the tank to about 8 hours, and increase the rate of filtration in the sand beds to about 85,000 gallons per acre per day. There seems to be no reason why, with proper attention, the plant should not give satisfactory results when operated at these rates.

The 6-inch outfall sewer from the sand beds at the plant serving the dormitory is to be extended 300 feet and the effluent from the plant discharged into the farm ditch at a point about 700 feet east of the dormitory. The grade of the extension will be 1.04 per cent.

The outfall sewer from the sedimentation tank serving the farm house is to be extended about 600 feet and effluent discharging into the farm ditch at the same point at which the effluent from the plant serving the dormitory will be discharged. This line will be of 6-inch vitrified tile laid on grades varying from 1.2 to 7.5 per cent.

There are several bends in each of these extensions, and no manholes are provided at these points, but since the line will carry only the plant effluent no trouble should be experienced from stoppages. The stream in the farm ditch into which these outfalls will discharge is small, but is said always to have some flow.

A chlorinating apparatus is to be installed in the shed about 150 feet below the sedimentation tank serving the farm house, and the effluent from the tank is to be treated with chlorine at the rate of 7.2 parts per million, applied at the manhole adjacent to the shed. This installation is intended for temporary use only. If it is decided to occupy the farm house permanently the owner intends to build a sewage disposal plant consisting of sedimentation tanks and sand filters of suitable size to care for the flow from the building. No details of the chlorinating apparatus or the manner in which chlorine will be applied to the tank effluent have been submitted. Some arrangement should be made at the point of application to assure a thorough mixture of the chlorine with the effluent.

In view of the results of our examination of these plans and after careful consideration of the essential features of the design, I beg to recommend that the plans be approved and a permit issued for the discharge of the effluent from the sewage disposal plants into a stream on the Thomas Cochran property tributary to the Hudson river with the following conditions:

1. That whenever required by the State Commissioner of Health a plant for the more complete treatment of the sewage from the farm house be constructed and put in operation.

2. That the chlorinating apparatus be arranged to apply the chlorine to the effluent from the farm house sedimentation tank in an effective manner.

3. That the rate of application of the chlorine be at all times not less than 10.0 parts per million.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 30, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to Thomas Cochran to discharge effluent from the sewage disposal plants at the Gray Mouse Farm near Kingston into the waters of a small stream tributary to the Hudson river at the point of discharge shown by the plans within the town of Saugerties in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That only sanitary or domestic sewage and no storm water or surface water from roofs or other areas shall be admitted to the disposal plant.

4. That no sewage sludge from any part of the disposal plants shall be discharged into the stream or other body of water.

5. That chlorine shall be at all times properly applied to the effluent from the farm house sedimentation tank at the rate of not less than 10 parts of available chlorine per million parts of sewage effluent.

6. That whenever the flow of sewage to either of the two disposal plants shown by the plans shall exceed that contributed by 25 persons the disposal plants shall be enlarged or additional works for the treatment of the sewage shall be constructed and put in operation under plans satisfactory to this Department.

7. That whenever required by the State Commissioner of Health satisfactory plans for works for a more complete treatment of the sewage from the farm house shall be submitted for approval and after approval of such plans the works provided for shall be installed and put in operation at such time or times as said Commissioner may designate.

M. NICOLL, JR.,
Deputy State Commissioner of Health

November 2, 1917

SCOTIA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for a screening plant and outfall sewer for the village of Scotia, Schenectady county, submitted to this Department for approval by the Board of Trustees on June 13, 1917.

Original plans for a comprehensive sanitary sewer system for the village and for a pumping station and sewage disposal works consisting of detritus chambers, settling tanks, dosing chamber and intermittent sand filters were approved on May 15, 1905. The pumping station and sewage disposal works were subsequently constructed in general accordance with the approved plans but owing to difficulty experienced in operating the pumping station and the high cost of pumping through a long force main against a static head of some 50 feet the disposal works were not put in operation and permission was granted to the village allowing the temporary discharge of untreated sewage into the Mohawk river near the pumping station just below the Schenectady and Scotia highway bridge.

As a result of complaints of the pollution of the Mohawk river by the discharge of sewage from the village of Scotia and sewage and industrial wastes from the city of Schenectady an investigation of the sewerage conditions of the village was made by a representative of this Department on October 25, 1916. This inspection showed that very objectionable conditions were created by the discharge of raw sewage into the Mohawk river at a point about 700 feet above the Schenectady Boat Club which was one of the complainants. As a result of this investigation on order was issued to the village of Scotia on November 5, 1916, requiring that the village put the pumping station, grit chambers and setling tanks forming a portion of the existing disposal works, in operation on or before June 1, 1917. On March 2, 1917, the time for completing the construction of the plant and putting it in operation was extended upon application of the village from June 1 to October 1, 1917.

A number of conferences were subsequently held in this office with representatives of the village who claimed that the cost of pumping sewage would amount to from $2,000 to $2,500 a year, and that the village wished to defer for a time the operation of the existing works. In view of this request, and owing to the comparatively small population of the village and the very large dilution afforded by the Mohawk river, the village was advised that consideration would be given to the approval of plans providing for effective screening of the sewage at the present pumping station and for the discharge of the screened sewage into the Mohawk river below the Schenectady Boat Club, since this would abate existing conditions of nuisance in the river and would form a part of the final sewage disposal works.

The village of Scotia is situated on the northerly side of the Mohawk river opposite the city of Schenectady in the eastern part of Schenectady county. The population of the village in 1915, according to the last State census, was 3,790 and it was estimated that the present population is about 4,000. The rate of increase of the population of the village has been very rapid. The population has increased from 304 in 1904, when it was incorporated, to about 4,000 in 13 years.

The village is provided with a public water supply derived from driven wells and the waterworks are controlled by the municipality. The village is also provided with a comprehensive sanitary sewer system which serves practically the entire population and discharges into the Mohawk river as noted above, through a single outlet near the existing pumping station.

According to data submitted by the village engineer the average daily flow of sewage is about 132,000 gallons per day, equal to approximately 30 gallons per capita. This low per capita rate of flow is attributed to the universal metering of the water supply.

The Mohawk river at Scotia has a drainage area of about 3320 square miles and is canalized at this point. Although the flood flow of the river near Scotia is as high as 50,000 cubic feet per second, flows as low as 300 cubic feet per second have been recorded for a number of days in succession. The State dam located at Cresent below Schenectady largely controls the elevation of the river so that it fluctuates comparatively little at Scotia during the greater part of the year.

The plans now submitted have been designed along comprehensive lines and show that it is proposed to convert the existing pumping station into a screening plant. One of the pump wells of the pumping station which is

10 feet by 12 feet in plan is to be filled with sand to a depth of from 6 to 9½ feet, and is to be so constructed as to provide for the installation of two sets of inclined bar screens. The remaining pump well which is the same size as the other is to be left for future use either for the installation of bar screens or for the installation of fine mesh mechanical screens.

The two proposed inclined bar screens are to be operated in series. One of the screens is to be composed of ½-inch by 2-inch bars, spaced 1 inch center to center. The other is to be composed of 1-inch by 2-inch bars spaced 2 inches center to center. Each screen is to be about 3½ feet long by 4 feet wide giving a total screening area of 14 square feet which should be adequate for the present population and at the same time provide for a reasonable increase in population in the future.

I am of the opinion, however, that the proposed spacing of the bars of the screen is not suitable to provide for an efficient screening of the sewage. The first screen should have clear openings between the bars of not more than 1½ inches and the second screen should have clear openings between bars of not more than ½ inch. The bars themselves also appear to be unnecessarily heavy and massive and they would reduce considerably the effective screening area of the screens. It should not be necessary to have the bars more than ⅞ inch thick by 2 inches wide.

The effluent from the screening plant is to be discharged into deep water of the Mohawk river at a point about 60 feet from shore below the N. Y. C. & H. R. R. bridge some 700 feet below the Schenectady Boat Club. The proposed outfall sewer which is to be about 2,200 feet long is to be 18 inches in diameter and will have a slope of 0.1 per cent. Under ordinary conditions this sewer will have a carrying capacity of about 2,000,000 gallons when flowing full which should be adequate for the present and probable future needs of the village inasmuch as the present sewage flow is only about 132,000 gallons per day according to report of the Village Engineer.

The water surface of the river near the outlet is marked 4.2 on the plans which according to the report of the Village Engineer is 1.2 feet higher than the crest of the dam at Cresent below Schenectady and 0.7 feet higher than the normal stage of the river. It would appear, therefore, that the operation of the screen chamber will not be interfered with except during times of high water and that there will be very little if any more back watering of the sewer in Washington avenue than at present during floods in the river.

From our careful examination of the plans I am of the opinion that the proposed screen chamber if properly constructed and maintained should satisfactorily meet the local requirements for sewage disposal and that the effluent from the screen chamber may be safely discharged into the Mohawk river below the railroad bridge without objection at this time. The screening chamber will moreover readily lend itself to extensions and modifications and will permit of installing either a duplicate set of bar screens such as provided for by the present plans or for the installation of mechanically operated fine mesh screens. Should additional preliminary treatment of the sewage be required in the future such treatment works could in all probability be constructed near the proposed outlet. A drop of 1 foot has been provided in the outfall sewer at the manhole below the railroad to provide operating head for such works and should it become necessary to pump the sewage in the future for more complete treatment such pumping station could in all probability be most economically located and operated near the proposed outfall sewer so that the works now proposed would form a part of future works when constructed.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge of screened sewage from the village of Scotia into the Mohawk river below the N. Y. C. & H. R. R. bridge. I would further recommend that the permit contain in addition to the usual revocation and modification clauses, the following conditions:

1. That the spacing of the bars of the coarse bar screen be not greater than 1½ inch in the clear.

2. That the spacing of the bars of the fine bar screen be not greater than ½ inch in the clear.

3. That whenever required satisfactory plans for supplementary or more complete treatment of the sewage shall be submitted for approval and that after the approval of such plans any and all portions of such supplementary or more complete treatment works shall be constructed and put in operation at such time or times thereafter as may be stipulated by the State Commissioner of Health.

Respectfully submitted,

THEODORE HORTON,

ALBANY, N. Y., *June* 18, 1917 *Chief Engineer*

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Trustees of the village of Scotia to discharge effluent from the works for preliminary treatment of the sewage into the waters of the Mohawk river at the point shown by the plans within the municipality of Scotia in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That both the sewers and sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers and sewage disposal works.

5. That no sewage sludge or screenings from any part of the disposal works shall be discharged into the Mohawk river or any other watercourse.

6. That the spacing of the bars of the screens shall not be greater than 1½ inches in the clear for the coarse screen, and ½ inch in the clear for the fine screen.

7. That whenever required by the State Commissioner of Health satisfactory detailed plans for additional works for more complete treatment of the sewage of the village of Scotia shall be submitted for approval; and that after approval of such plans any or all portions of such additional or supplementary works for more complete treatment of sewage shall be constructed and put in operation at such time or times thereafter as said Commissioner may designate.

M. NICOLL, JR.,

Acting Deputy State Commissioner of Health

June 19, 1917

SHERRILL (Oneida Community, Ltd.)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of amended plans for outfall sewers and sewage disposal works for Kenwood and the city of Sherrill, Oneida county, submitted to this Department for approval by Oneida Community, Ltd., on July 20, 1917.

Original plans for sewerage and sewage disposal for what were then the unincorporated villages of Kenwood and Sherrill occupied largely by people connected with the Oneida Community, Ltd., were approved on May 31, 1914. Although the sewer system provided for by these plans was constructed the sewage disposal works were not installed and on March 31, 1917, amended plans for outfall sewers and sewage disposal works for this community were submitted for approval. It is found from our examination of these latter plans that although they had in general been designed to meet the local and general requirements for sewage disposal, they were not in satisfactory condition for final approval and were returned to the Oneida Community, Ltd., on April 19, 1917, with the recommendation that they be modified in the following respect:

1. That the sludge capacity of the Imhoff tanks be increased to 300 cubic feet each.
2. That the effluent pipe from the disposal plant be extended to Oneida creek with the outlet submerged at low water stage in the stream.
3. That detailed plans for the proposed contact beds be submitted for approval in connection with the detailed plans for the preliminary treatment works.

Reference is made to our report on the examination of the plans referred to dated April 19, 1917, for a description of the sewerage and sewage disposal systems and these systems will not be described in this report.

The plans now submitted show they have been revised and modified in general accordance with our recommendations and provide for a disposal plant consisting of a screen chamber, meter, 4 settling tanks of the Imhoff type, 2 sludge drying beds and 2 contact beds divided into 6 units each. The settling tanks have been increased in depth from 22 feet to 27 feet 8 inches, thereby increasing the sludge capacity of each tank from 1,600 to 3,000 cubic feet as recommended.

The contact beds are to be filled to an average depth of 4 feet with filtering material composed of gravel ranging in size from 1 to 2 inches. They will have a total combined area of 2½ acres and will, therefore, provide for a rate of operation of 400,000 gallons per acre per day, equal to a rate of 100,000 gallons per acre per day per foot of depth of filtering material when serving a population of 10,000 persons assuming a rate of sewage contribution of 100 gallons per capita per day. The effluent from the contact beds is to be discharged through a submerged outlet into Oneida creek.

It appears from the plans that before all of the contact can be constructed it will be necessary to change the course of the creek opposite the plant somewhat. The elevation of the bottom of the contact beds is 446.45 and according to the report of the designing engineer the low water elevation of Oneida creek at the point of discharge is 443.6 and 300 feet down stream is 442.7 so that the operation of the contact beds will not be interfered with except during extreme high water.

The dosing apparatus which is to be of the type designed by F. A. Barbour of Boston, Mass., is to be located in a compartment in the center of the contact bed area of each bed of 6 units. According to the report submitted with the plans it appears that this dosing apparatus can be arranged to operate any or all units of each contact bed and that the time of contact may be regulated as desired. The capacity of the 12-inch pipes from the settling tanks is somewhat limited and it may be found necessary to replace them with larger pipes before the capacity of the disposal works is exceeded. According to the report of the designing engineer it is planned to construct 3 units of one of the contact beds at first. These three units will care for a population of 2,500 persons on the basis of design used. One settling tank which it is proposed to construct at first also will have sufficient capacity to care for a population of 2,500 so that with the installation of the screen chamber, one Imhoff tank, one sludge drying bed and 3 units of the contact beds as planned a well balanced plant will be obtained which should be adequate to care for a population about 40 per cent in excess of the

present population tributary to the sewer system which is said to be about 1,800. Whenever the population shall exceed 2,500 the disposal plant should be enlarged proportionately by installing additional units.

In view of the above I would recommend that the plans be approved and a permit be issued allowing the discharge of effluent from the proposed sewage disposal plant into Oneida creek within the town of Vernon on the consideration that the disposal works be enlarged proportionately by the construction of additional units as the population tributary to the plant increases so that rates for which the works were designed will at no time be exceeded.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July* 23, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Puplic Health Law" as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to Oneida Community, Ltd., to discharge effluent from the sewage disposal works to be constructed in connection with the sewer system at Kenwood and the city of Sherrill, into the waters of Onedia creek, at the point of discharge shown by the plans within the town of Vernon, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the outfall sewer and the sewage disposal works shown by the plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers and sewage disposal works.
5. That no sewage sludge from any part of the disposal works shall be discharged into Oneida creek or any other watercourse.
6. That the sewage disposal works, of which it is planned to construct only a part of each portion of the works at this time, shall be enlarged proportionately by the construction of additional tanks as the population tributary to the plant increases in such manner that the rates of operation for which the works were designed will at no time be exceeded.

M. NICOLL, JR.,
Deputy State Commissioner of Health

July 23, 1917

STAMFORD

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for a sewer extension in Roosevelt avenue, in the village of Stamford, Delaware county, submitted to this Department for approval by the Board of Trustees and Board of Sewer Commissioners on May 18, 1917.

The records of this Department show that a report was made by an engineer of the then State Board of Health under date of March 8, 1890, in regard to the practicability of introducing a system of sewers at a moderate cost in Stamford and the construction of sewers was recommended in that report. Plans for sewerage and sewage disposal works were approved by the Board of Health on June 17, 1892. Roosevelt avenue, in which the sewer extension for which approval is at present requested is not shown on the plans approved in 1892. Extensions of the sewer system were approved by the State Department of Health on December 7, 1905, and on April 16, 1910, the second of which was shown on the plans originally approved, while the first was an extension and modification of the original plans.

On July 23, 1914, an investigation of the sewage disposal plant was made by an engineer of this Department and in the report prepared upon this investigation it is pointed out that the sewage disposal plant was inadequate at that time to properly treat the sewage from the village and it was recommended "that the village of Stamford be advised to secure the services of an expert to study the situation and design works to properly treat the sewage of the village, these works to take the place of the present inadequate works, and that on completion of the plans they be submitted to this Department for approval as required by the Village and Public Health Laws, and that upon receiving this approval the village proceed immediately to the construction of the works."

The plans at present submitted for approval were prepared by Mr. E. W. Moxley, an engineer of Ravena, N. Y., and comprise duplicate blue prints of the proposed sewer extension. The plans show that it is proposed to construct approximately 1160 feet of 8-inch sewer in Roosevelt avenue, from a point near the Murdock-Raynor line fence to a junction with an existing 8-inch sewer in Main street, at a point about 50 feet southeasterly of the Delaware river.

The proposed sewer is to be laid on grades ranging from 1.0 per cent to 2.55 per cent. and is to be straight between manholes which are provided at intervals in no case exceeding 360 feet. A flush tank is to be located at the upper end of the proposed extension. The sewer is, therefore, apparently to be of adequate size to care for the volume of sewage which under normal conditions would be contributed to it and is to be laid on slopes sufficiently steep to provide self-cleansing velocities of the sewage in the sewer and prevent clogging. Adequate provision is also to be provided for inspecting and flushing the sewer.

The sewage contributed to the proposed sewer extension is to be discharged through the existing sewerage system of the village into the village disposal plant and thence into the west branch of the Delaware river. It is apparent that this sewer extension will ultimately be required to take care of the sewage from a considerable number of people and as the sewage disposal plant is inadequate to care for the sewage at present being contributed to it, additional sewage discharged into it would still more overtax the disposal plant. Steps should, therefore, be taken by the village to provide adequate sewage disposal works for the sewage of the village as recommended in the report of this Department, dated October 13, 1914.

In view of the results of our examination of these plans and after careful consideration of the situation in regard to sewerage and sewage disposal in the village of Stamford, I beg to recommend that the plans for a sewer extension in Roosevelt avenue be approved, and that a permit be issued allowing the discharge of sewage therefrom through the village sewerage system and sewage disposal plant into the west branch of the Delaware river, on condition that on or before March 1, 1919, satisfactory plans for sewage disposal be submitted for approval in general accordance with the recommendations of the report of this Department, dated October 13, 1914.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 19, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Sewer Commissioners to discharge sewage from the proposed sewer extension in Roosevelt avenue, in the waters of the west branch of the Delaware river, through the present sewer outlet within the municipality of Stamford, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That on or before March 1, 1919, satisfactory detailed plans for the construction of new and adequate works for the proper treatment of the sewage of the village of Stamford shall be submitted to this Department for approval; and that after approval of said plans any or all portions of such works shall be constructed and put in operation at such time or times thereafter as the State Commissioner of Health may designate.

M. NICOLL, JR.,
May 29, 1917 *Acting Deputy State Commissioner of Health*

STEUBEN COUNTY TUBERCULOSIS HOSPITAL

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

Plans for sewage disposal for the Steuben County Tuberculosis Hospital located near Bath, Steuben county, were submitted to this Department for approval on August 23, 1917.

The plans were prepared by Messrs. Pierce & Bickford, Architects of Elmira, and comprise the following maps and drawings:

1. United States Geological Survey map showing location of Steuben County Tuberculosis Hospital.
2. One set of blue prints containing:
Sheet No. 1. Plot of ground showing location of building.
Sheet No. 2. Scale drawing of hospital and sewage disposal system together with cesspools, diverting manholes, and dry well, also section showing grade of sewer lines.
Sheet No. 3. Details of septic tank.
3. Two sets of specifications.

The hospital is located about a mile northeast of the village of Bath, and according to the report of the architects is to accommodate 28 patients and 4 attendants. The water supply is to be obtained from the mains of the public supply of the village. No information is given in the report, however, regarding the water consumption. There are no streams near the site of the building and it is proposed to dispose of the sewage by means of a septic tank and cesspool. The ground upon which the sewage disposal is to be located is of loose gravel formation and sand formed by glacial drift. There are no wells in the vicinity and there appears to be no possibility of pollution of a water supply. There is low ground at a point southwest of the hospital which, however, is to be drained by a ditch. According to the plans, the

sewage disposal system is to be located on higher ground to the east of this low area. The rain water from the roof is to be disposed of in a separate cesspool or dry well.

The septic tank is to be constructed of concrete and in plan will be 5 by 16 feet, having a depth to the water surface of about 5 feet, and a total capacity of 3,000 gallons, which allowing for a water consumption of 100 gallons per capita, would provide for nearly 24 hours' detention. Baffles will be constructed near the inlet and outlet. Adjacent to the septic tank is to be constructed a dosing tank of 700 gallons capacity, which is to be equipped with an automatic siphon. Manholes are provided for entering both the septic tank and the dosing chamber. A sludge bed is to be provided to receive the sludge from the septic tank. From the dosing chamber the effluent from the septic tank will discharge into a diverging manhole, which will divert the sewage into either of two cesspools. Gates are to be provided to control the flow. The cesspools are to be 10 feet in diameter by 7 feet deep, and are to be constructed of hollow tile laid perpendicular to the circumference. Each cesspool is to be provided with a suitable manhole equipped with cast iron cover. The cesspools will be located about 100 feet apart.

The dry well which is to receive the rain water from the roof is to be constructed of cement blocks laid so that the hollow portion of the block is perpendicular to the circumference. This dry well is to be about 8 feet in diameter at the bottom converging to about 3½ feet at the top and will be about 8 feet deep.

Neither the plans nor the report accompanying them show whether there is suitable ground or room for subsurface irrigation in connection with the cesspool should this be required for future development. Previous correspondence, however, stated that there was room for such disposal. It seems, therefore, that if the present plans have not made proper provision, they should be rearranged so that a subsurface irrigation system can be installed later if it is found necessary.

From our careful examination of the plans it appears that the proposed sewage disposal plants for the Steuben County Tuberculosis Hospital, if properly constructed and maintained with care and efficiency, should satisfactorily care for the sewage from the hospital.

I would, therefore, recommend that the plans be approved, provided suitable ground and sufficient area is available for the construction of a subsurface irrigation system in connection with the future development, should such construction be found necessary.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 28, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Steuben County Tuberculosis Hospital, to discharge effluent from the proposed sewage disposal plant to be installed at this institution into the ground waters tributary to Cohocton river, within the town of Bath, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That the sewage disposal plant shown by the plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That no sanitary or domestic sewage and no storm water from roofs or other areas shall be admitted to or pass through the sewage disposal plant.

5. That no sludge from any portion of the sewage disposal plant shall be discharged into any stream or watercourse.

6. That whenever required by the State Commissioner of Health detailed plans for additional cesspools or for some other satisfactory method of disposal of the sewage shall be submitted to this Department for approval; and that upon approval of said plans such additional or other satisfactory works for the treatment of the sewage shall be constructed and put in operation at such time or times thereafter as the said Commissioner may designate.

M. NICOLL, JR.,
August 30, 1917 *Deputy State Commissioner of Health*

SUFFOLK COUNTY TUBERCULOSIS HOSPITAL

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of amended plans for sewage disposal for the Suffolk County Tuberculosis Hospital near Holtsville in the town of Brookhaven, submitted to this Department for approval on November 14, 1917.

General plans for sewage disposal at this hospital were approved on August 27, 1915, and on October 22, 1915, detailed plans of a sewage disposal plant for the institution consisting of a settling tank, dosing chamber and subsurface irrigation system designed to care for an ultimate population of 75 persons were approved.

An inspection of the sewage disposal plant at the hospital was made by a representative of this Department in the autumn of 1916 at the request of the Board of Managers. It was found from this inspection that although the settling and dosing tanks appeared to have been constructed in general accordance with the approved plans, the subsurface irrigation system did not contain the required amount of tiling nor was it properly constructed so that the sewage broke through the ground at a number of points and flowed over the surface giving rise to insanitary conditions.

The plans now submitted provide for the substitution of leaching cesspools for the present subsurface irrigation system. An inspection of the proposed site of the cesspools and of the conditions of the existing subsurface irrigation system was made by one of the engineers of this Department on November 16, 1917. The condition of the existing system was found to be practically the same as at the time of the previous inspection and it appeared that it could not be put in satisfactory operating condition without entirely reconstructing the system of subsurface tiling.

The site of the proposed cesspools is located considerably farther from the buildings of the institution and is more favorable for the disposal of sewage than that of the existing system. The proposed site is well drained and the land has a gentle slope in a westerly direction away from the roadway and the institution. The soil, a sample of which was analyzed, was found to consist of a clean sand having an effective size of 0.17 mm. and a uniformity coefficient of 2.8.

According to the present plans it is proposed to abandon the existing subsurface irrigation system and to convey the effluent from the existing settling tank to a system of cesspools to be located about 300 feet southwest of the administration building. The outlet from the dosing tank is to be inter-

cepted a few feet from the tank by a 6-inch sewer some 250 feet long leading to a gate chamber near the cesspools. The upper section of this sewer is to be some 200 feet long, and is to be constructed of vitrified tile pipe. The lower section, under the roadway, is to be constructed of cast iron pipe laid in the existing 24 inch culvert. A manhole is to be constructed at the point of change of horizontal alignment near the roadway. Although the slope on which this sewer is to be laid is not shown, it appears from the topography that sufficient fall is available to give a slope of not less than 1 per cent for this line.

It is planned to construct a two way gate chamber and two series of two cesspools each at present and to add one cesspool to each series in the future if necessary. A gate chamber provided with two outlets and two shear gates so arranged as to permit of operating either series of cesspools at a time is to be installed above the cesspools.

The cesspools are to be 9 feet deep and from 8 feet to 7 feet 4 inches in diameter inside dimensions and are to be provided with submerged outlets. The bottom of the cesspools is shown to be back-filled to a depth of 12 inches with the excavated sand. This arrangement appears to be unnecessary. In fact the sand layer would reduce the capacity of the settling tank and could be omitted to advantage.

The cesspools are to be constructed of hollow 4-cell building blocks 12 inches by 12 inches by 12 inches in size according to the plans although the specifications call for 9-cell terra cotta wall blocks. The 4-cell blocks would be more suitable than the 9-cell blocks inasmuch as the cells in these blocks are larger and will be more easy to clean out than the smaller cells of the 9-cell blocks, and the architect has stated that, notwithstanding the specifications, the 4-cell blocks as shown on the plans will be used.

It would be well to fill the cells of the building blocks with sand in order to facilitate cleaning of the cesspools in case of clogging since it will be much easier to replace the sand in the cells with new sand than it would be to clean the cesspools if the sand filling of these were omitted.

The outlets of the cesspools are shown located 12 inches below the inlets. The proposed arrangement would reduce the capacity of the cesspools unnecessarily. It would also require building the second cesspool of each series lower than necessary and placing any subsurface irrigation system that might be constructed to relieve the cesspools in the future, much lower than desirable. It would be better, therefore, to place the inverts of the outlets and the inlets at the same level.

From our careful examination of the plans I am of the opinion that the proposed cesspools, if properly constructed and operated, will satisfactorily care for the sewage from the hospital at present. It is probable, however, that the cesspools will become clogged owing to the high rate at which they will be required to operate and that it will soon become necessary to either construct additional cesspools or to install a number of lines of subsurface tiling to care for the overflow from the cesspools.

The latter method would, in all probability, be both a much more satisfactory and economical method of caring for the overflow from the cesspools. It would appear that 5 lines of subsurface tiling, 100 feet long each, laid from the last cesspool of each series should, in connection with the cesspools, satisfactorily care for a probable future population of 75. These lines of tile should be installed whenever the proposed cesspools become overtaxed and before they begin to overflow. It might be well when the cesspools are constructed to anticipate the future laying of subsurface tiling by inserting five short lengths of tile in the walls of the lower cesspools.

The lines of tile when installed should be laid at a depth of from 15 to 18 inches below the surface of the ground and on a uniform slope of approximately but not more than 6 inches per hundred feet. The joints of the tile should be properly protected by means of burlap, tar paper, or other suitable material to prevent the infiltration of sand and the consequent clogging of the lines.

In view of the above and after a careful consideration of the essential features of the design I would recommend that the plans be approved on condition that whenever necessary or required either additional cesspools or lines of subsurface tiling be installed to care for the overflow from the proposed cesspools.

Respectfully submitted,

THEODORE HORTON

Chief Engineer

ALBANY, N. Y., *November* 20, 1917

The plans were approved November 24, 1917.

UTICA STATE HOSPITAL (Marcy Division)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of preliminary plans for sewage disposal for the Marcy Division of the Utica State Hospital to be developed by the State at Marcy, on the northerly side of the Mohawk river about 5 miles northwest of Utica.

It appears from the communication received from the State Architect with the plans that before the development of this site is commenced it is desired by him to obtain a tentative approval of plans for the disposal of sewage for this hospital. The general plans submitted provide for a sewage disposal plant consisting of a screen chamber, diverting chamber, 4 Imhoff tanks, 4 intermittent sand filters divided into 4 units each and a chlorination plant with a discharge of effluent into a small stream which flows through the property and discharges into Crane's creek near the westerly boundary line of the property about 1,000 feet from the disposal plant.

The disposal plant is designed to care for a future population of 6,000. It is planned, however, to construct only 2 units of the Imhoff tanks and 2 sand filters in connection with the screen chamber and chlorination plant at first. Such plant would care for a population of 3,000. The sand filters have a total area of approximately 12 acres and will therefore provide for a rate of operation of 50,000 gallons per acre per day.

Although the plans have not been worked out in detail, making it impracticable to finally pass upon them, it appears that the proposed sewage disposal works, if properly designed and constructed along the lines indicated by the plans and if the works are maintained with care and efficiency, should produce a high degree of purification of the sewage of the hospital. I am of the opinion, however, that the local conditions do not require such a high degree of purification of the sewage at this time and that sedimentation and sterilization would probably be all that would be necessary, provided the outlet pipe be extended to Crane's creek or possibly to the Mohawk river, since the Mohawk river, which at this point has a fairly high flow, is not used for water supply purposes below the proposed disposal works. In fact, the permits issued in connection with the approval of plans for sewerage for municipalities in the vicinity of Marcy have required only preliminary treatment of sewage with provisions for supplementary or more complete treatment whenever required in the future. If sedimentation and sterilization only are provided for at this time the plant should be so located as to permit of installing and operating by gravity flow supplementary or more complete treatment works such as sand filters or possibly sprinkling filters when necessary in the future, and the final plans submitted by the architect should include at least general plans for such more complete or supplementary treatment works.

In view of the above, I would recommend the approval of the present preliminary plans on condition that before the construction of the disposal plant is commenced detailed plans for sewage disposal for the proposed hospital shall be submitted for approval.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July* 28, 1918

The plans were approved on July 28, 1918, on the condition that detailed plans for the various portions of the proposed works shall be submitted for approval before the construction of the plant is commenced.

WARWICK (Sterling Forest Hotel)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of the revised plans for sewage disposal for the Sterling Forest Hotel at Sterling Forest in the town of Warwick, Orange County, submitted to this Department for approval on April 2, 1917.

The Sterling Forest Hotel is a summer hotel, located on the easterly side of Greenwood Lake adjacent to the boundary line between the States of New York and New Jersey. Although it is occupied largely in the summer, it is understood that there are a few people at the hotel during the winter as well. The water supply for the hotel and adjacent cottages is obtained from a dug well located some 180 feet northeast of the hotel.

Plans for the disposal of sewage for the hotel providing for a settling tank, dosing tank and cesspools with a few lines of subsurface tiling, were first submitted for approval on December 30, 1916. It was found from our examination of these plans that they were not in satisfactory condition for approval and they were, therefore, returned to the Designing Engineer with recommendations that they be modified in certain respects. After some correspondence and a conference in this office with the Designing Engineer, the plans were revised and submitted for approval on April 24, 1917, as noted above.

Sewage disposal

The plans now submitted and under consideration show that it is proposed to care for the sewage in a sewage disposal plant consisting of a settling tank, dosing tank, chlorination plant. The effluent from the plant is to be discharged into Greenwood Lake at a point 150 feet from shore where the water has a depth of 10 feet.

Settling tank

The proposed settling tank is to be a covered concrete structure 16 feet long, 9 feet wide and 6 feet deep inside dimensions with a depth below the flow line of 5 feet. It will have a capacity of about 5,400 gallons and will, therefore, provide for a detention of the sewage of about ½ day assuming a per capita rate of sewage contribution of 100 gallons per day and a tributary population of 100. The tank is to be provided with three baffles, a submerged outlet and a covered 24-inch manhole. The top of the manhole is to be about 9 inches below the surface of the ground. It would be better to carry the manhole up level with the surface of the ground so that it may be readily located in case it is necessary to enter the tank for cleaning, inspection or repairs. It would be well also to omit the intermediate baffle and to place one of the baffles nearer the inlet of the tank, and the other ba e nearer the outlet than proposed.

Sludge disposal

The settling tank is to be provided with a 4-inch wrought iron sludge pipe which is to extend from a point near the bottom of one corner of the settling tank to the chlorination chamber where it terminates in a threaded section. According to a note on the plans it appears that it is proposed to connect a pump hose coupling to this pipe when the sludge is to be removed. No statement is made as to the proposed method of disposal of the sludge, however. The sludge should under no condition be discharged into Greenwood lake or into any stream tributary to the lake but should be buried or disposed of in trenches and covered over at a sufficient distance from the lake or dwelling to prevent pollution of the lake or the creation of insanitary conditions.

Dosing tank

From the settling tank the settled effluent is to be discharged through a submerged outlet into an adjacent dosing tank provided with a 4-inch automatic discharge siphon of the Miller type by means of which the effluent is to be discharged intermittently into the chlorination chamber. The dosing chamber is to be 5 feet wide, 8 feet long, 4½ feet deep inside dimensions with a depth below the high water mark of 3 feet 2 inches. The siphon has a draft of only 17 inches so that if the dosing tank is constructed as planned the sewage in the tank will be drawn down only to within 1¾ feet of the bottom at each discharge of the siphon.

This would be an unsatisfactory arrangement inasmuch as the dosing tank would act as a sedimentation tank and sludge would in all probability accumulate in the bottom of the tank. Although provisions are made for removing this sludge by pumping as in the case of the settling tank it would be better to raise the floor of the tank to the low water level at elevation 622.78 as indicated by the plans and to simply have a small sump a few inches deep around the siphon.

Clorination plant

It is proposed to treat the effluent with liquid chlorine which is to be applied to the sewage by means of a chlorine apparatus of the Wallace & Tiernan Company type. The chlorine apparatus is to be actuated by a float in a float pipe in the chlorination tank. This tank will provide for a detention period of the treated effluent of about ¾ hours.

According to the plans and report of the Designing Engineer, the settled sewage from the dosing tank will be discharged by means of a siphon into a 4-inch cast iron T which connects with a second cast iron T and a cross from which is to extend two 8-inch cast iron pipes one of which is to be used as a mixing chamber where the chlorine is to be applied and the other as a float chamber for the operation of the control of the chlorinating apparatus. The outlet from the chlorination tank is to consist of a 1-inch lead siphon by means of which it is planned to intermittently draw down the treated effluent in the chlorinating tank and discharge it into the outlet pipe leading to the lake. A 1-inch drain hole is provided in the cross by means of which the liquid in the float and mixing chambers will be drawn down between each discharge of the siphon.

The proper application of the liquid chlorine to the sewage depends largely upon the proper operation of the 1-inch lead siphon and the drain hole. I am of the opinion that the 1-inch siphon and the 1-inch drain hole are too small to operate satisfactorily with sewage and would be liable to become clogged. It would be well, therefore, to increase both the drain hole and the siphon to say not less than 2 inches in diameter. If this should be too large a nipple or reducer could be placed on the drain hole and on the inlet or the outlet of the lead siphon so as to obtain an orifice of 1 inch in diameter if desired. This nipple or reducer could be readily removed for cleaning if necessary.

No statement has been submitted with the plans as to the amount of chlorine to be applied. Not less than 15 parts of chlorine per million of sewage treated should be used based upon a per capita rate of sewage contribution of 100 gallons per day. This would require about 1¼ lbs., of liquid chlorine per day for a tributary population of 100 persons.

Conclusions and recommendations

From our careful examination of plans, I am of the opinion that the proposed sewage disposal plant if modified as suggested above and if properly constructed and provided it is maintained with care and efficiency should produce an effluent that might be discharged into Greenwood Lake without objection at this time.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge of effluent from the proposed sewage disposal plant into Greenwood Lake on the following conditions:—

1. That not less than 15 parts of chlorine per million parts of sewage treated be applied to the effluent from the settling tank.
2. That the drain hole of the float and mixing chambers and the lead outlet siphon be increased to not less than 2 inches in diameter except that reducing nipples may be provided if necessary.
3. That the manholes on the settling and dosing tanks be carried up level with the surface of the ground.
4. That the bottom of the dosing tank be raised not less than 1 foot, 6 inches.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *April* 27, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the proprietor of Sterling Forest Hotel to discharge effluent from the proposed sewage disposal plant to treat the sewage from the said hotel into the waters of Greenwood lake at the point of discharge shown by the plans within the town of Warwick in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewers and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That only sanitary or domestic sewage and no storm water or surface water from grounds, roofs or other areas shall be admitted to the proposed sewage disposal plant.
5. That no sewage sludge from any part of the disposal works shall be discharged into Greenwood lake or any other watercourse or body of water.
6. That not less than 15 parts of chlorine per million parts of sewage shall be properly applied at all times to the effluent from the settling tank.

7. That the size of the drain holes in the float and mixing chambers and the lead outlet siphon shall be increased to not less than 2 inches in diameter except that reducing nipples may be provided if necessary.

8. That the manholes on the settling and dosing tanks shall be carried up level with the surface of the ground.

9. That the bottom of the dosing tank shall be raised not less than 1½ feet.

M. NICOLL, JR.,
Acting Deputy State Commissioner of Health

April 30, 1917

WATERTOWN

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for proposed sewers in the city of Watertown, Jefferson county, submitted to this Department for approval by the city engineer on behalf of the Board of Public Works, on December 29, 1916.

Plans for proposed sewers in Newell, Lepper and Howk streets were approved by this Department on November 20, 1916. These sewers were to be tributary to the Engine street outlet sewer. The plans now submitted show that it is proposed to modify somewhat the sewers in Howk and Lepper streets and the sewer in a portion of Newell street and provide for a new discharge into the Black river below the dam between Lepper and Howk streets. According to a communication received from the city engineer in reference to the plans it appears that in making the assessments for the construction of the proposed sewers as originally planned considerable opposition was made to their construction, not only by the property and factory owners on Newell street which are already provided with private sewers, but also from the property owners on Lepper and Howk streets on the grounds of the high cost of these sewers which would require considerable excavation in rock in their construction. It is claimed, however, that sewers, especially those in Howk and Lepper streets, are absolutely necessary inasmuch as sewage now flows on top of the ground and in the gutters from the houses on these streets. It is, therefore, planned to construct comparatively shallow sewers in Lepper and Howk streets and in a portion of Newell street between these streets and omit temporarily the extension of the Newell street sewer to the Engine street outlet.

The plans show that all of the proposed sewers are to be laid from 3 to 4 feet below the surface of the ground. They are all to be 8 inches in diameter. The proposed sewer in Howk street which is to be laid on a slope of 1.37 per cent is to be about 350 feet long. The sewer in Lepper street which is also to be about 350 feet long is to be laid with a slope of from 7½ to 4½ per cent. The greater portion of the sewer in Newell street is to have a slope of 3.04 per cent. Manholes are to be placed at the upper ends of the sewers in Howk street and Lepper street and also at the intersection of the sewers in these streets with the Newell street sewer. No manhole is shown, however, at the point of change of horizontal alignment of the Howk street sewer nor at the point of change of slope of the Lepper street sewer. A manhole or at least a lamp or inspection hole should be placed at each of these two points in order to facilitate the cleaning and inspection of these sewers.

It appears from our examination of plans that although the proposed sewers which are to be laid from 3 to 5 feet higher than the sewers provided for by the original plans will, in all probability, not drain any fixtures placed in the cellar of the houses in that section, they should in other respects satisfactorily care for the sewage from the proposed sewers on these streets. There should, moreover, be no difficulty in intercepting the sewage tributary to these sewers by an intercepting sewer when such sewer is constructed owing to the relatively high elevation of the proposed sewers.

In view of the above I would recommend that the plans be approved and a permit be issued allowing the discharge of sewage from the proposed sewers into the Black river below the dam between Lepper and Howk streets.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 19, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Public Works of the city of Watertown to discharge sewage from the proposed sewer extensions in Newell, Lepper and Howk streets into the waters of Black river below that dam between Lepper and Howk streets within the municipality of Watertown in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

LINSLY R. WILLAMS,
Acting State Commissioner of Health

January 24, 1917

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for proposed sewer extensions to be built in Magone street and vicinity in the city of Watertown, Jefferson county, N. Y., originally submitted to this Department for approval by the Board of Public Works of the city on September 25, 1917, and resubmitted with certain modifications and amendments on October 15, 1917.

The plans as now submitted contemplate the construction of about 4,000 feet of 8 and 10-inch lateral sewers to be built in Magone street, Pollard street, Leach street and Boyer avenue in the city, and the construction of a 12-inch trunk sewer 1,200 feet long connecting these laterals to the North Side Trunk Sewer. Plans for the last-named sewer were approved by this Department on April 17, 1912.

All the laterals and trunk lines are to be laid without change in vertical or horizontal alignment between manholes, and have grades steep enough to produce satisfactory self-cleansing velocities if properly laid. Manholes are provided at all intersections, and in general intervals of not less than 400 feet on all lines. In no case does the distance between manholes exceed 550 feet. The 12-inch trunk line with its grade of 1.36 per cent has a capacity of a little over 1,000,000 gallons per 24 hours flowing half full, a figure somewhat in excess of the present requirement. The district, however, which may ultimately be drained to this trunk comprises about 150 acres, and it is estimated that the population of this district, including the employees in certain new shops, will within a short time, reach 6,000. The proposed trunk line has ample capacity to serve this number of people.

Besides the proposed sewers, the plans submitted show a 10-inch sewer on Hoard street and a 12-inch line on Starbuck avenue. Plans for an 8-inch line on the former street were approved by this Department on June 2, 1916. The size was later changed to 10-inch and the grade and alignment slightly modified. The engineer in his report states that through some oversight the plans for this alteration of the Hoard street sewer were not submitted to this Department for approval before the line was constructed. The line is laid on a satisfactory grade, and is of ample size to serve the district tributary to it. The Starbuck Avenue line was laid by the New York Air Brake Company in 1905, before Starbuck avenue became a city street, without the approval of this department. The sewer originally discharged into the ditch crossing Magone street near Trade court. When the Hoard Street sewer was constructed in 1916, the Starbuck Avenue line was connected to its upper extremity. The engineer in his report states that the map and profile of this line, as shown on the plans now submitted, were taken from the records of the New Air Brake Company, and that from personal examination of the sewer he believes the records to be substantially correct. The size, grade and alignment of the sewer are such that there appears to be no objection to the incorporation of this line in the general sewerage system of the city.

In view of the results of our examination of these plans and after careful consideration of the original features of the design, I beg to recommend that plans be approved on condition that only sanitary or domestic sewage be permitted to enter the proposed sewers and the present sewers on Starbuck avenue and Hoard street; and that a permit be granted for the discharge of the sewage from these lines into the Black river through the present sewer outlet near the mouth of Cowens creek.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 18, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of public works of the city of Watertown to discharge sewage from the proposed sewers in Magone, Chaffee, Pollard and Leach streets, and in Boyer and Starbuck avenues into the waters of the Black river near the mouth of Cowens creek, within the municipality of Watertown, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

M. NICOLL, JR.,
Deputy State Commissioner of Health

October 22, 1917

WEBB (O. M. Eidlitz)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of the plans for sewage disposal for the camp of Mr. O. M. Eidlitz on Fourth lake, Herkimer county, N. Y. submitted to this Department for approval on October 2, 1917.

According to the report of the designing engineer, the camp is located on the north shore of Fourth lake. It is stated that the regular population to be cared for is 6 persons and the daily water consumption is estimated at 25 gallons per capita.

Sewage disposal

It is proposed to treat sewage from the camp in a sewage disposal plant consisting of a double compartment settling tank and a dosing tank. The effluent from the dosing tank is to be discharged through a 6-inch tile sewer into Fourth lake.

Settling tank

The sewage from the camp is to be conveyed to the settling tank through a 5-inch sewer. This tank, which is to be rectangular in plan, consists of two compartments. The first compartment is 5 feet wide, 6 feet long and has a depth of 3½ feet below the flow line, giving a capacity of 105 cubic feet. The sewage from this compartment will flow into the second compartment through an open brick work section 1 foot, 6 inches high, extending the width of the tank. The bricks are to be laid on end and have a horizontal space of 1 inch between them. A 4-inch concrete wall 1 foot, 6 inches high will serve as a foundation for the brick work and will keep the sludge from getting into the second compartment. From the top of the brick work the concrete wall will extend to the cover of the tank. The second compartment is to be 3 feet, 4 inches long, 5 feet wide and have a depth of 3 feet, 6 inches below the flow line, giving a capacity of 58 cubic feet. The total capacity of the two compartments would, therefore, be 163 feet or about 1,200 gallons. This should give the sewage a detention period in the tanks equal to 2 days' flow on the usual basis of design of 100 gallons per capita. Although the settling tank appears to have ample capacity to care for the probable flow of sanitary sewage, tributary to it, its depth should be increased to not less than 4 feet below the flow line, and its width should be so decreased as not to increase its capacity. It appears from the examination of the plans that the settling tanks and dosing tank have no venting. They should be properly vented by some such means as the providing of perforated manhole covers or a vent pipe extending upward along a building or tree. A baffle should also be placed in front of and about 12 inches from the inlet pipe of the first compartment of the tank.

Dosing tank

The sewage from the second compartment of the settling tank flows in a dosing tank 5 feet long, 5 feet wide having a depth of 1 foot, 10 inches below flow line, giving a capacity of about 46 cubic feet. This tank is to be connected with a Miller siphon by means of which the sewage may be discharged through a 6-inch tile drain into the lake. The outlet end of the tile drain should be submerged below the low-water mark.

Conclusions and recommendations

From a further careful examination of the plans, it is found that although the proposed sewage disposal plant has been designed to meet the local requirements, there are certain modifications, as noted above, which should be made in the construction of the plant in order not only to increase the efficiency, but also to reduce the work and cost of maintenance.

I, therefore, recommend that the plans be approved and a permit issued for the discharge of effluent from the proposed sewage disposal plant into Fourth lake on the following conditions:

1. That the depth of the settling tank be increased to not less than 4 feet below the flow line and the width so decreased as not to increase the capacity of the tank.

2. That the settling tank and dosing tank be properly vented.
3. That a baffle be placed in front and 12 inches from the inlet pipe in the settling tank.
4. That the outlet end of the effluent pipe be submerged below the low-water mark.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 9, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to O. M. Eidlitz to discharge effluent from the proposed settling tank to treat the sewage from his camp on Fourth lake, into the waters of Fourth lake near said camp, within the town of Webb, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof, except as provided in conditions 6, 7, 8 and 9 of this permit.
4. That only sanitary or domestic sewage and no storm water or surface water from grounds, roofs or other areas shall be admitted to the proposed settling tank.
5. That no sewage sludge from any part of the disposal works shall be discharged into Fourth lake or any other watercourse or body of water.
6. That the depth of the settling tank shall be increased to not less than four (4) feet below the flow line and the width so decreased as not to increase the capacity of the tank.
7. That the settling tank shall be properly vented.
8. That a baffle shall be placed 12 inches in front of the inlet to the settling tank.
9. That the effluent pipe from the settling tank shall be extended into Fourth lake in such a manner as to be submerged at low water stage.

M. NICOLL, JR.,
Deputy State Commissioner of Health

October 11, 1917

WHITE PLAINS (Gedney Way Station)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of plans for sewage disposal for the Gedney Way Station of the New York, Westchester and Boston Railway Company, near White Plains, Westchester county, submitted to this Department for approval by the Engineer of Maintenance on behalf of the company, on November 16, 1917.

The Gedney Way Station of the New York, Westchester & Boston Railway is located in the town of White Plains, about 1½ miles south of the center of the city of that name. The natural drainage of the land in the vicinity of the station is taken by a small stream which flows in a southerly direction parallel to the railway tracks and about 40 feet distant from them. This stream is a tributary of the Mamaroneck river, and its water forms a part of one of the sources of supply of the New York Inter-urban Water Company, which furnishes water to the city of Mount Vernon, the town of Harrison, and the village of Mamaroneck. The water from this source of supply is taken by the company from the Mamaroneck river at an intake located about 3½ miles below Gedney Way, and is passed through pressure filters and treated with chlorine before being delivered to the consumer. According to the report of the engineer of the railway company, the soil in the neighborhood of the station is a sandy loam. The sewage to be cared for is that which will be received from the fixtures located in the station, comprising two toilets, two wash bowls and a slop sink.

The plans contemplate the construction of a water tight concrete cesspool for retaining the solids of the sewage; and a covered bed of broken stones, without walls or floor, for receiving the overflow from the cesspool.

The cesspool as shown is a square covered concrete tank of about 2,800 gallons capacity; and is to be located on the east side of the railway tracks, 152 feet distant at its nearest point from the stream mentioned above. The walls and floor of the tank are of concrete, 12 inches thick without openings, making the tank water tight for all practical purposes. Since it is intended to allow the liquid effluent from the tank to soak into the soil from the stone bed immediately adjacent, this form of construction is not only unnecessary but undesirable. By making the walls of the tank porous a considerable surface would become available for the absorption of the liquid portion of the sewage, and the quantity to be cared for by the floor of the stone bed would be materially reduced. It would appear desirable, therefore, to construct the cesspool with dry rubble walls of suitable thickness, or walls of hollow tile laid with the openings extending in a radical direction. The floor of the cesspool should be omitted entirely, and, if necessary, a concrete footing provided for supporting the walls.

The inlet of the tank is in the center of the west side, about 4 feet below the surface of the ground, and the outlet in the south side about 2 feet below the surface; that is, the outlet is 2 feet above the inlet which will cause the pipe leading to the tank to stand full of sewage for a considerable distance, a condition which will be very likely to cause stoppages in the line. The inlet and outlet pipes should be arranged so that the water level of the tank will always be below the invert of the inlet pipe, and the outlet pipe should be fitted with a "T" extending about 18 inches below the surface of the liquid to prevent scum, which will form on the surface, from passing out of the tank and clogging the stone bed.

A bed of broken stone is to be constructed immediately adjacent to the cesspool. This bed is to be 8 feet square and to extend from the surface of the ground to a point below the water level of the tank. No walls or floors are provided. The effluent from the cesspool will overflow into the bed and filter into the ground through its sides and bottom. At its nearest point, this bed is over 150 feet from the bank of the stream mentioned above as part of one of the sources of supply of the New York Inter-Urban Water Company.

The site of the plant is on the opposite side of the railroad embankment from the stream and the elevation of the ground at the site is below that of the stream. The surface drainage from the immediate vicinity of the plant reaches the stream at a point about 1200 feet south of the cesspool.

A 6-inch tile sewer about 220 feet long will conduct the sewage from the station to the cesspool. This line as indicated on the drawings has three sharp bends none of which are provided with manholes. The grade of the sewer is not given. This line should be laid with a fall of not less than 2 feet

per 100 feet, and all bends made with " Y's " and ⅛ bends so arranged as to be easily reached in case it is necessary to clean the line.

In view of the results of our examination of these plans and after careful consideration of the design and of local conditions, I beg to recommend that the plans be approved and a permit issued for the discharge of the effluent from the disposal plant by percolation through the soil into tributaries of the Mamaroneck river, in the town of White Plains, Westchester county, with the following conditions:

1. That the plant be constructed and operated in accordance with the rules and regulations for the protection from contamination of the public water supply furnished by the New York Inter-Urban Water Company of Westchester county, made, ordained and established on the 16th day of September, 1907, pursuant to chapter 661 of the Laws of the State of New York for 1893, as amended by chapter 589 of the Laws of 1896.
2. That the cesspool or tank for receiving the sewage be constructed without a floor and with porous walls of dry rubble, hollow tile or other suitable material.
3. That the inlet and outlet of the cesspool or tank be so located that the invert of the inlet will always be above the water line of the tank.
4. That the outlet of the cesspool or tank be protected by a " T " or some form of baffle to prevent the scum and floating material from passing out.
5. That the sewer leading to the cesspool or tank be laid with a uniform fall of not less than 2 feet per 100 feet.
6. That all bends in the sewer line be made with " Y's " and ⅛ bends, and that the " Y's " be so arranged as to be readily accessible in case it is necessary to clean the sewer.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *November* 23, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the " Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the New York, Westchester & Boston Railway Company, to discharge effluent from the disposal plant to be constructed at the Gedney Way Station of the New York, Westchester & Boston Railway Company, into the waters of a tributary of the Mamaroneck river, within the town of White Plains, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That the plant be constructed and operated in accordance with the rules and regulations for the protection from contamination of the public water supply furnished by the New York Inter-Urban Water Company of Westchester county, made, ordained and established on the 16th day of September, 1907, pursuant to chapter 661 of the Laws of the State of New York for 1893, as amended by chapter 589 of the Laws of 1896.
4. That in no case shall the effluent or any liquid from any part of the disposal plant or sewer be allowed to flow on the surface of the ground.

5. That the cesspool or tank for receiving the sewage be constructed without a floor and with porous walls of dry rubble, hollow tile or other suitable material.

6. That the inlet and outlet of the cesspool or tank be so located that the invert of the inlet will always be above the water line of the tank.

7. That the outlet of the cesspool or tank be protected by a "T" or some form of baffle to prevent the scum and floating material from passing out.

8. That the sewer leading to the cesspool or tank be laid with a uniform fall of not less than 2 feet per 100 feet.

9. That all bends in the sewer line be made with "Y's" and ⅛ bends and that the "Y's" be so arranged as to be readily accessible in case it is necessary to clean the sewer.

M. NICOLL, JR.,
Acting Deputy State Commissioner of Health

November 27, 1917

WHITESBORO

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of plans for proposed sewer extension in the village of Whitesboro, Oneida County, submitted to this Department for approval by the Board of Trustees on June 26, 1917.

The village of Whitesboro is situated on the southwesterly side of the Mohawk river about 3 miles above the city of Utica. It had a population of 2,493 in 1915 according to the last State census.

Plans for a comprehensive sanitary sewer system together with general plans for sewage disposal for the village were approved by this Department on November 14, 1900. Although the village was permitted to temporarily omit the construction of the disposal plant, it appears that the sewer system has been constructed in general accordance with the approved plans. On July 13, 1916 plans for a comparatively short sewer extension on Clyne Place in the village were approved on the following conditions:

> That whenever required by the State Commissioner of Health satisfactory detailed plans for preliminary purification of the entire sanitary sewage of the village of Whitesboro by screening or sedimentation, accompanied by general plans for additional or supplementary works for more complete treatment of the sewage shall be submitted to this Department for approval; and upon approval of said plans such works for preliminary purification by screening and sedimentation shall be constructed and put in operation at such time or times thereafter as said Commissioner may designate.

The plans now submitted show that it is proposed to construct a 6-inch sewer in First and New streets tributary to the existing sewer in First street which discharges into the Mohawk river through the existing outfall sewer.

The proposed sewer is to be about 350 feet long and is to be constructed with a slope of 1 per cent. A manhole is to be constructed at the intersection of New and First streets and a flush tank is to be installed at the upper end of the sewer in New street. The street along the line of the sewer is to be graded to provide for a fill of about 4 feet over the sewer.

As pointed out in the report on our examination of the plans for the proposed sewer in Clyne Place dated July 11, 1916, although the additional amount of sewage that will be discharged into the Mohawk river after the construction of the proposed sewer will not be great, steps should be taken to provide for at least a partial treatment of the sewage now discharged into the river in order to eliminate, as far as practicable, the gross pollution of this stream. It may be pointed out that as the result of action taken by

this Department a sewer system and sewage disposal plant consisting of a screen chamber and a settling tank of the two story Imhoff type are being constructed in the village of Oriskany located about 3 miles above Whitesboro. In the village of Yorkville located about 1 mile below Whitesboro, a sewer system and a sewage disposal plant consisting of a screen chamber and plain settling tank have been constructed.

In the case of Utica, located about 3 miles below Yorkville, a portion of the sewage of the city on the north side of the river is being treated and the permit recently issued to the city of Utica in connection with the approval of the plans for additional sewers in the city contained in addition to the usual revocation and modification clauses the condition that satisfactory plans for the interception and preliminary treatment of the entire sanitary sewage of the city be submitted to this Department for approval on or before May 1, 1919.

In view of the above, I would recommend that plans for the proposed sewer in the village of Whitesboro be approved and a permit be issued allowing the discharge of sewage from this sewer into the Mohawk river in the town of Whitesboro on condition that on or before May 1, 1919, satisfactory detailed plans for the preliminary treatment of the sewage of the village by sedimentation be submitted for approval together with general plans for supplementary or more complete treatment of such sewage.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 29, 1917

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by Section 77 of Chapter 49 of the Laws of 1909, the "Public Health Law," as amended by Chapter 553 of the Laws of 1911, constituting Chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Trustees of the village of Whitesboro to discharge sewage from the proposed sewer extensions in First and New streets into the waters of the Mohawk river through existing outfall sewer within the town of Whitesboro in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That on or before May 1, 1919, satisfactory detailed plans for preliminary treatment of the entire sanitary sewage of the village of Whitesboro by sedimentation, accompanied by general plans for additional or supplementary works for more complete treatment of the sewage shall be submitted to this Department for approval; and that after approval of said plans such works for preliminary treatment of the sewage shall be constructed and put in operation whenever required by the State Commissioner of Health.

M. NICOLL, JR.,
Acting Deputy State Commissioner of Health

June 28, 1917

WINGDALE (State Prison)

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on our examination of plans for sewage disposal for the proposed Wingdale prison at Wingdale, submitted to this Department for approval by the New York State Commission on New Prisons on March 8, 1917.

The site for the proposed prison comprises an area of about 600 acres of land situated near the central part of the town of Dover, Dutchess county, about 70 miles north of New York city and about 1/8 mile south of the Wingdale Station on the Harlem Division of the New York Central and Hudson River Railroad. The railroad passes along the westerly side of the property. Although the area adjacent to the railroad is comparatively flat and partly swampy, the greater portion of the property is very hilly and rises to an elevation of some 600 feet above the railroad or about 1,000 feet above sea level.

According to the data submitted with the plans, it appears that whereas locations of the buildings have not definitely been determined upon they are in general to be situated on the southwesterly portion of the property. It is stated by the report on the plans that the sewage from the greater portion of the proposed buildings will be collected and flow by gravity to a manhole to be located near the east central portion of the property and that the sewage from the buildings below this level will be pumped. The exact location or details of the design of the proposed pumping station are not included with the present plans, nor are any of the proposed buildings shown.

Sewage disposal

It is proposed to treat the sewage of the institution in a sewage disposal plant consisting of a screen chamber, 2 settling tanks, dosing chamber, intermittent sand filters and a chlorination plant to be located in the northwesterly portion of the property. The disposal plant has been designed to care for an ultimate future population of 2,000 and a sewage contribution of 200,000 gallons per day. The effluent from the plant is to be discharged into a small stream which rises in the northerly portion of the property and discharges into Swamp river a few hundred feet west of the outlet.

Swamp river has a drainage area at this point of about 19 square miles. It has a sluggish flow opposite the property and flows in a northerly direction for a distance of about 7 miles to Ten-Mile river, which stream discharges into the Housatonic river near the hamlet of Bulls Bridge, Conn. There are no large communities on the Swamp or Ten-Mile rivers below Wingdale and we have no records of any public water supplies taken from these streams below the proposed sewage disposal plant.

Screen chamber

The sewage from the institution is to be conveyed through some 1,300 feet of 10-inch sewer laid on a slope of 5 per cent to the diverting chamber at the disposal plant, from which the sewage may be discharged into either or both compartments of the proposed screen chamber. Each compartment is to be about 10 feet long, 4 feet wide and about 4 feet deep, inside dimensions, and is to be provided with a bar screen composed of ¼-inch by 2-inch bar screens spaced 1¼-inch center to center. The screen chamber is to be provided with notches in order to permit of inserting weirs if desired to measure the flow of sewage. From the screen chamber the screened effluent is to flow by gravity into the distributing troughs of the 2 proposed settling tanks.

Settling tanks

These tanks are of the 2-story Imhoff type. Each tank is to be divided by means of partitions into one settling compartment and 2 hopper-shaped sludge

compartments. The settling compartments have a combined capacity of about 30,000 gallons and will therefore provide for an average detention of the sewage of about 3.5 hours when serving a population of 2,000, assuming a contribution of sewage of 100 gallons per capita per day.

The sludge compartments have a combined capacity of approximately 3,500 cubic feet, equal to 1.7 cubic feet per person, for the estimated future population to be served. Each of the 4 sludge-storage hoppers is to be provided with an 8-inch cast iron sludge pipe, by means of which the sludge may be removed by gravity flow to the proposed sludge-drying areas to be located in the two corners of the proposed sand filters adjacent to the settling tanks. Each hopper is to be provided with 2 rings of perforated water pipe 1½ inches in diameter in order to facilitate the removal of sludge.

Dosing chamber

The clarified sewage from the settling tank will flow by gravity into the dosing chamber located adjacent to the settling tank. This dosing chamber is to be equipped with six 12-inch alternating discharge siphons, by means of which the sewage may be discharged intermittently into the various sand filters. Only 4 of the siphons will be put in operation at first. The dosing chamber has sufficient capacity to flood each of the 4 filters to a depth of about 1 inch, assuming that no sewage would seep through the sand during the time of discharge. The rate of application of the sewage to the sand filter will be equal to approximately 1 cubic foot per second for 500 square feet of sand filter area served.

Sand filters

The plans provide for the construction of 4 sand filters at first and provide for the construction of two additional filters when required in the future. These 4 filters, which have a combined area of 2.6 acres, have been designed to care for a population of approximately 1,300 persons. Additional filters should therefore be added whenever this population is exceeded. Each filter is to be filled to a depth of 3 feet with sand having an effective size of from .20 to .35 mm. and a uniformity coefficient not greater than 3. The distributing systems are to consist of systems of troughs by means of which the sewage may be distributed over the entire area of the beds. The underdrain system of each bed is to consist of lines of 5-inch bell and spigot vitrified tile pipe spaced 20 feet apart center to center and discharging into a main 8-inch collecting drain laid through the center of the bed. Inspection manholes are to be installed at the upper ends of the main drains and manholes provided with sumps for the interception of sand are provided on the line of the main collecting drain leading to the chlorination plant.

Chlorination plant

The chlorination plant, which is to be covered by a small building, is to be situated on the line of the effluent pipe from the sand filters. This plant is to be equipped with duplicate chlorination apparatus for the application of liquid chlorine. According to specifications, each chlorine apparatus will be capable of applying from .05 to .5 of a pound of chlorine per hour or from 1.2 to 12 pounds per day. No statement is made, however, as to the number of parts per million of chlorine to be applied to the effluent from the sand filters. Not less than 5 parts of chlorine per million parts of sewage treated should be applied to the effluent from the sand filters at all times.

The chlorine is to be applied at the inlet of the chlorination tank. This tank has a capacity of about 5,000 gallons and will therefore give a time of detention of about ½ hour. The chlorination tank is to be baffled and should provide a proper mixing of the treated effluent.

From our careful examination of the plans, I am of the opinion that if the plans are properly carried out they should satisfactorily meet local and general requirements for sewage disposal, and I would therefore recommend that they be approved.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 14, 1917

The plans were approved March 14, 1917.

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of amended plans for sewage disposal at the Wingdale Prison, Wingdale, N. Y., submitted to this Department for approval by the State Architect on June 14, 1917.

Original plans and specifications for sewage disposal for this institution were approved on March 14, 1917, and reference is made to our report on these plans dated March 14, 1917, for a description of the institution and of the sewage disposal plant. The original plans were designed to care for an ultimate future population of 2,000 and provided for a sewage disposal plant consisting of a screen chamber, 2 settling tanks of the Imhoff type, a dosing tank with 6 12-inch alternating siphons, 6 intermittent sand filters, a chlorination plant and two sludge-drying beds for the disposal of sludge. This disposal plant was to have been constructed by the institution with convict labor.

According to the data submitted with the present plans, the ultimate capacity to be provided for at the prison will be 600, and the work of constructing the disposal plant is, with the exception of furnishing and placing of the sand-filtering material for the intermittent sand filters, to be done under contract. The plans now submitted comprise drawings Nos. 2008, 2009, 2010, 2011, 2012 and specification No. 2782.

The present plans show that the disposal plant is to be located at the same site as provided for by the original plans and that the plant is to be similar to the original plant, except that it will have a smaller capacity.

Sewage disposal

The disposal plant is to consist of a screen chamber, two settling tanks of the Imhoff type, a dosing tank provided with four 8-inch alternating discharge siphons, 4 intermittent sand filters, a chlorination plant and two sludge-drying areas.

Settling tanks

The proposed settling tanks will have a combined capacity of about 11,600 gallons and will therefore provide for an average detention of the sewage of about 4 hours when serving 600 persons, assuming a per capita rate of sewage contribution of 100 gallons per day. Each tank is to be provided with 4 8-inch sludge pipes controlled by 8-inch valves so arranged that the sludge may be withdrawn to the sludge-drying bed by gravity flow from either of the 4 sludge hoppers of the settling tank. Each of the sludge pipes have a number of sharp turns which might interfere somewhat with the flow of sludge through the sludge pipes and may cause residual sludge, which may remain in the pipe after the sludge is blown out, to become desposited and caked in the pipe unless means are provided for flushing out the sludge pipe after each discharge of the sludge. This could readily be obviated by connecting a water-pressure pipe with the sludge pipe at a point just back of and on the tank side of the valve on the sludge pipe or to extend a smaller riser pipe from this point to the ground surface, with hose connection arranged for.

Dosing tank

The dosing tank, which is to be provided with 4 8-inch alternating siphons, will have sufficient capacity to flood one of the sand filters to a depth of about 1 inch at each discharge of a siphon. The siphons will have an average rate of discharge of approximately 3 cubic feet per second, equal to about 1 cubic foot per second for 5,000 square feet of sand filter area dosed, and should therefore provide for a satisfactory distribution of the sewage over the surface of the sand filter.

Intermittent sand filters

The proposed sand filters are to be of the same design as originally planned and will have a combined area of 1.2 acres, thus providing for a rate of operation of not more than 50,000 gallons per acre per day. The filtering material is to consist of sand 3 feet deep. The specifications, however, do not specify the effective size nor the uniformity coefficient of the sand but state that the sand will be furnished and installed by the institution. According to the letter submitted by the State Architect with the plans, the sand will conform with the specifications for sand contained in the original specifications approved by this Department. This sand, as specified by the original specifications approved on March 14, 1917, was to have an effective size of not less than 0.20 mm. and not greater than 0.35 mm. and a uniformity coefficient not greater than 3.0.

Chlorination

The chlorination plant is to be provided with duplicate liquid chlorine sterilizing devices of the manually operated direct feed type. Each device is to be capable of applying chlorine at rates of from 1.2 pounds to 12 pounds per day. No statement is made, however, as to the number of parts per million which is to be applied, but it is assumed that 5 parts per million will be used to sterilize the effluent.

Conclusions and recommendations

From our careful examination of the plans, it is found that the proposed sewage disposal plant, if carefully constructed in accordance with the plans and if operated with care and efficiency, should satisfactorily meet the requirements for which it was designed and should produce an effluent that might be safely discharged without objection into the small stream on the institution property tributary to Swamp river.

I would therefore recommend that the plans be approved on condition that the sand to be used for filtering material in the intermittent sand filters shall conform with the sand specified by the original specifications approved on March 14, 1917, which provided that the sand should have an effective size of not less than 0.20 mm. and not greater than 0.35 mm. and a uniformity coefficient not greater than 3.0.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 15, 1917

The amended plans were approved June 18, 1917.

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our examination of the amended plans for sewage disposal for Wingdale prison, Wingdale, Dutchess county, submitted to this Department for approval by the State Architect, on Septem-

ber 27, 1917. The original plans for sewage disposal were approved by this Department on March 14, 1917, and certain amendments were approved on June 18, 1917.

The amendment at present under consideration contemplates a slight change in the alignment of the 10-inch sewer leading to the diverting manhole at the screen chamber of the disposal plant. On the original plans this sewer follows a somewhat irregular course conforming to the topography of the ground. It is now proposed to carry the sewer in a straight line from manhole No. 10 to the diverting manhole, a distance of 864 feet, eliminating one manhole and slightly shortening the distance and increasing the grade of the sewer. The changes are indicated on drawing No. 2,033, which will replace drawing No. 2,012 of the set of plans for the sewage disposal plant, approved on June 18, 1917. No other changes from the design as approved on that date are proposed.

In view of the above, I would recommend that the amended plans for sewage disposal for the Wingdale prison, Wingdale, Dutchess county, be approved.

Respectfully submitted,

THEODORE HORTON,

ALBANY, N.Y., *October* 1, 1917 *Chief Engineer*

The amended plans were approved October 1, 1917.

YORKVILLE

Plans for certain sewer extensions to be constructed in Baylis, Russell, Hall and Bunker avenues, Fairview place and across the private right of way near the New York Central railroad in the village of Yorkville, Oneida county, N. Y., were submitted to this Department for approval on August 13, 1917. The plans were carefully examined by the Engineering Division of this Department and approved on August 22, 1917.

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees, village of Yorkville, to discharge sewage from the proposed sewer extensions in Baylis, Russell, Hall and Bunker avenues, Fairview place and across private right of way near the New York Central railroad into the waters of Mohawk river, within the municipality of Yorkville, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That all of the sewage to be collected by the proposed sewers shall, before its discharge into the Mohawk river, be passed through the village sewage disposal plant.

M. NICOLL, JR.

August 22, 1917 *Deputy State Commissioner of Health*

INDIVIDUAL PERMITS ISSUED DURING 1917, UNDER SECTIONS 76 AND 78 OF CHAPTER 49 OF THE LAWS OF 1909, THE PUBLIC HEALTH LAW, CONSTITUTING CHAPTER 45 OF THE CONSOLIDATED LAWS

LOCATION	To whom issued	Date, 1917	Waste matter	Discharged into
Afton, Chenango county	Afton Development Co	Aug. 10	Manufacturing wastes	Susquehanna river.
Angelica, Allegany county	Borden's Condensed Milk Co.	Mar. 22	Effluent from works to treat wastes from creamery	Angelica creek.
Brighton, Monroe county	Trustees of Friendly Home	Aug. 22	Effluent from sewage disposal plant to treat sewage from the home (see page 38).	Allen creek.
Clifton, St. Lawrence county	Benson Mines Co	Mar. 14	Effluent from works to treat sewage from new toilet rooms (see page 49).	Little river.
Cornwall, Orange county	Firth Carpet Co	April 17	Effluent from works to treat factory and industrial wastes (see page 51).	Moodna creek.
Delhi, Delaware county	Delhi Products Co	Oct. 8	Effluent from works to treat wastes from creamery (see page 57).	Delaware river.
Dresden, Washington county	Howard W. Starr	Sept. 12	Effluent from disposal plant to serve residence (see page 60).	Lake George.
Greece, Monroe county	Rochester Folding Box Co	Nov. 27	Effluent from disposal plant to serve factory (see page 66).	Tributary of Genesee river.
Greenburg, Westchester county	Trustees of Union Free School.	June 18	Effluent from disposal plant to serve school (see page ——).	Tributary of Saw Mill river.
Hunter, Greene county	Mr. Mansfield Ferry	Nov. 27	Effluent from disposal plant to serve residence (see page 75).	Tributary of Schoharie creek.
Independence, Allegany county	Borden's Condensed Milk Co.	April 3	Temporarily the wastes from creamery of said company	Cryder creek.
Middletown, Delaware county	Chancey S. Hull, Pres. Elgin of the Catskills.	Oct. 11	Effluent from settling tank to treat creamery wastes	Tributary of Delaware river.
Mt. Pleasant, Westchester county.	Mr. John T. MacCurdy	April 30	Effluent from disposal plant to serve property	Tributary of Pocantico river.
New Hartford, Oneida county	Standard Silk Co	Sept. 11	Effluent from disposal works to treat sewage from their factory (see page 98).	Tributary of Sauquoit creek.
North Hempstead, Nassau county.	Trustees of E. Williston school	Oct. 5	Effluent from disposal works to serve school (see page 107).	Tributary of Hempstead bay.
Ovid, Seneca county	Mr. M. R. Coleman	April 17	Effluent from disposal works to serve Coleman House (see page 115).	Cayuga Lake.
Philmont, Columbia county	Board of Education of the village of Philmont.	Dec. 1	Effluent from sewage disposal plant to serve school (see page 117).	Tributary to Claverack creek.
Pittsford, Monroe county	Trustees of Pittsford high school.	July 23	Effluent from disposal works to serve school (see page 119).	Tributary of Irondequoit bay.
Pittsford, Monroe county	General Filtration Company	Sept. 10	Effluent from sewage disposal plant to treat sewage from factory (see page 122).	Tributary of Irondequoit bay.

INDIVIDUAL PERMITS ISSUED DURING 1917, ETC.— *Continued*

LOCATION	To whom issued	Date, 1917	Waste matter	Discharged into
Ramapo, Rockland county	Ramapo Finishing Company	Nov. 27	Effluent from disposal works to treat sewage and trade wastes (see page 125).	Nakama brook.
Rye, Westchester county	Mr. A. C. Gwynne	Jan. 12	Effluent from disposal plant to serve property (see page 136).	Long Island Sound.
Saugerties, Ulster county	Mr. Thomas Cochran	Nov. 2	Effluent from sewage disposal plants, to serve Gray Mouse Farm (see page 136).	Tributary of the Hudson river.
Schroeppel, Oswego county	Rosemary Creamery Company	Aug. 4	Waste water and washings from creamery	Pennellville creek.
Sherrill, Oneida county	Oneida Community, Ltd	July 23	Effluent from sewage disposal works to serve Kenwood and Sherrill (see page 141).	Oneida creek.
Sodus, Wayne county	Sodus Packing Company	Jan. 24	Effluent from two treatment plants to serve the packing plant.	Tributary of Lake Ontario.
pencer, Tioga county	The Empire Creamery Company.	Dec. 20	Effluent from settling tank to treat wastes from creamery.	Tributary of Catatonk creek.
Warwick, Orange county	Proprietor of Sterling Forest Hotel.	April 30	Effluent from sewage disposal plant to treat sewage from hotel (see page 150).	Greenwood lake.
Webb, Herkimer county	Mr. O. M. Eidlitz	Oct. 11	Effluent from settling tank to treat sewage from camp at Fourth Lake (see page 155).	Fourth Lake.
White Plains, Westchester county.	New York, Westchester & Boston Railway Co.	Nov. 27	Effluent from disposal plant to treat sewage from Gedney Way Station (see page 157).	Tributary of Mamaroneck river.

GENERAL INVESTIGATIONS RELATING TO SEWERAGE AND SEWAGE DISPOSAL

In many municipalities of this State the important problem of properly providing for the collection and disposal of sewage is often unfortunately neglected or inadequate and inefficient methods are employed. As a result of this neglect insanitary and unhealthful conditions are frequently brought to the attention of this Department through direct complaints or by requests from the local authorities for assistance in meeting the problem.

A thorough investigation of the sewerage conditions in the municipality is made in such instances by an engineer from this Department and a report is prepared in which are pointed out the proper steps to be taken to provide a permanent remedy. Although this Department is without direct power to compel the installation of systems of sewerage and sewage disposal and consequently the completion of its work is curtailed, yet, in many cases effective action is taken by the local authorities on the advice and at the instigation of this Department.

The reports of the investigations made by this Department in the more important cases which have come before it during 1917 are given below and a list is appended of all other cases.

ANGOLA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation made in regard to sewerage conditions of the village of Angola, town of Evans, Erie county. The inspection was made on May 11, 1917, by Mr. Albert I. Howd, inspecting engineer in this Department, as a result of a complaint in regard to improper disposal of sewage in the village of Angola.

Angola is located in the southwestern part of Erie county, about 2 miles east of Lake Erie and 22 miles south of Buffalo. It is on three railroads, namely, the New York, Chicago & St. Louis, the Lake Shore & Michigan Southern and the Pennsylvania railroads, and also on one electric railway, namely, the Buffalo & Lake Erie Traction line.

The village is situated on slightly rolling land which drains into the Big Sister creek, a stream flowing through the eastern part of the village. The soil is clayey earth underlaid, the inspector was informed, by shale. There

has been a decided increase of the population of Angola in the last 5 years. In 1915 the population according to the census was 1,194, an increase of 296 or 33 per cent since 1910. The village is provided with a public water supply derived from Lake Erie, about 85 per cent of the houses being supplied with public water, all of which are metered. Main street, the principal street of the village, is paved. Electric lights, gas and other modern facilities are available.

About 75 per cent of the houses of Angola are supplied with cesspools or septic tanks. The inspector was informed that before any are allowed to be connected with the village sewers or storm water drains they must be approved by the village board of health. About 25 per cent of the houses have privies, most of which are in the vicinity west of High street, the newer section of the village.

An 18-inch sewer constructed by the railroad company extends from a point near the railroad station through the property of Dr. B. E. Smith to Main street where it branches and goes through South Main street and finally discharges into Big Sister creek. Later the railroad company extended the 18-inch sewer directly west from where it entered Main street to Big Sister creek. The outlet of this 18-inch sewer is at the top of a very precipitous bank. A long wooden trough has been constructed from the end of the sewer to the foot of the bank and the effluent from the sewer flows down this trough. From the foot of the bank the sewage flows over the ground about 50 feet to the creek.

All of the sewage and wastes from the houses, stores and buildings within the area bounded by School street and the B. & L. E. Traction line on the north, by the L. S. & M. S. railroad tracks on the east, by Lake street and the railroad tracks on the south, and by High street on the west, discharge eventually into a sewer which branches west from the Main street sewer between Lake and Center streets. From Main street this sewer goes through private property to the foot of the bank of the L. S. & M. S. railroad and discharges into an open ditch which runs along the railroad property several hundred feet and finally discharges into the Big Sister creek. At the end of the sewer pipe considerable amounts of paper and rags were noticeable and a distinct odor was detected. During warm weather considerable odor arises from this ditch, the inspector was informed. Sometime ago the village of Angola was notified by the railroad company that they intended to fill up the ditch, hence other provision will have to be made for disposing of the sewage from this district. Dr. B. E. Smith stated that the village authorities had talked of extending the sewer from the present outlet through private property about parallel to the present ditch to the Big Sister creek.

Another sewer extends north through Main street and discharges into a ditch along the edge of the highway. The banks of the ditch were covered with a dirty grey sediment or growth characteristic of substances washed by sewage and household wastes. After flowing along the ditch for some distance it flows under the highway and eventually finds its way into Big Sister creek.

From the above inspection it appears that the steps which have been taken by the village of Angola to provide sewerage facilities to take care of the sanitary sewage have not been effective. The difficulty has been that in the past the sewers have been installed without regard to any comprehensive sewer plan and, therefore, without proper regard for future needs.

I therefore, recommend that the village employ a competent sanitary engineer to prepare plans for a comprehensive system of sewerage and a sewage disposal plant, these plans to be submitted to this Department for approval as provided by the Public Health Law. While this law requires that the plans submitted shall cover the whole village and show an adequate system of sewage disposal, this does not mean that the entire system must be installed at once. Only the more necessary portions of the system need be built at present and application can be made at the same time that application is made for the approval of the plans for permission to omit temporarily from construction such sewers as are not at present needed. Furthermore

the funds for the construction of the more necessary portions of a general sewer system may be provided for by the issuance of long term bonds.

It will be seen that the village can thereby proceed to rectify the existing insanitary conditions in such a manner that the first cost and the annual cost may be made very moderate and at the same time may provide, finally, a complete and adequate sewer system to take care of all future needs of the village.

I would further recommend that copies of this report be submitted to the sanitary supervisor and the health officer of the village of Angola for presentation to the village board and that the village authorities be urged to take steps at once to carry out the recommendations of this report.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 1, 1917

A copy of this report was enclosed in a letter addressed to the local board of health, urging that steps be taken to carry out the recommendations of this report.

CANANDAIGUA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation made of the pollution of the Canandaigua outlet at Canandaigua by the sewage and trade wastes from Canandaigua, Ontario county. This investigation was made on August 9 and 11, 1916, by Mr. Morton F. Sanborn, Assistant Engineer, as a result of complaints received in regard to such pollution.

Canandaigua is an incorporated city of about 7,501 inhabitants as shown by the 1915 census. It is situated at the foot of Canandaigua lake and the head of the outlet which goes by the same name. Canandaigua is the county seat of Ontario county and is located near the center of the county. The city is on the Auburn branch of the N. Y. C. & H. R. R. R. and the Northern Central R. R. and has trolley service to Rochester. The city is largely a residential district, although there are several factories and industries, the largest being the Lisk Manufacturing Company, which employs about 500 persons. The number of inhabitants has been increasing slowly of recent years, there being 6,151 in 1900, 7,217 in 1910 and 7,501 in 1915.

The water supply of the city is obtained from Canandaigua lake, the intake being about 2 miles up the lake and 500 feet from shore in about 50 feet of water. This water is pumped direct to the mains and reservoir of the city and is used without purification of any kind. Practically all of the inhabitants are served with this water supply. The daily consumption varies from 800,000 to 900,000 gallons per day, the greater consumption occurring during the summer months. About 150,000 gallons are used daily by the different industries and railroads.

Canandaigua outlet, into which the sewage and trade wastes of Canandaigua are discharged, flows about 8 miles northeasterly through Chapin, Shortsville and Manchester and thence easterly about 12 miles through Clifton Springs and Phelps and then northerly about 8 miles and empties into the Clyde river at Lyons. Chapin is an unincorporated village with a population of about 100 and is located about 4 miles below the lake; Shortsville, an incorporated village of about 1,228 inhabitants, is located about 3 miles below Chapin; Manchester, an incorporated village of about 1,115 inhabitants, is located about 1 mile below Shortsville; Clifton Springs, an incorporated village of about 1,664 inhabitants, is located about 5 miles below Manchester; and Phelps, also an incorporated village with a population of about 1,375, is located about 5 miles below Clifton Springs.

A complaint was recently received from Shortsville in regard to the pollution of the outlet by the city of Canandaigua. Complaints have also been received previously from the different villages as far as Clifton Springs. As a result of an investigation made in 1906 on account of complaints of nuisance due to pollution of water at Canandaigua, recommendations were made by this Department to the village of Canandaigua that sewage treatment in septic tanks be provided and that the flow through the outlet be controlled at the lake in order that as large an amount as possible of water be passed through the outlet during periods of low flow. It was understood by this Department that plans were drawn for the treatment of the sewage, but they were never submitted to this Department for approval; and no treatment works were constructed.

Sewer system

The sewer system consists of about 17 miles of sanitary sewers and 9 miles of storm water drains. The sewer system is divided into two districts, namely: The west side system, which takes in about one-fourth of the village, and the east side system, which takes in about three-fourths of the city. The sewers of the west side vary from 8 inches to 20 inches and those of the east side vary from 8 inches to 15 inches. There is some roof water but no catch-basins draining to the sanitary sewer. The sewer system serves about 75 per cent. of the inhabitants and the total sewage flow was estimated to be about 800,000 or 900,000 gallons or about the same as the water consumption.

The outfall of the west side sewer is located in the bed of Canandaigua outlet, about 200 feet below Main street. The east side sewer outlet is located in the bed of Canandaigua outlet several hundred feet below Saltonstall street.

Some years ago the village of Canandaigua bought strips of land on both sides of the outlet from Canandaigua to Chapin, and also purchased all riparian rights on the outlet to and including water power and dam at Chapin.

Much of the sewer system was constructed previous to 1913 and permits for same were not required. Permits were issued in 1904 for some extensions to the sewer system and temporary permits were issued by this Department on January 28, 1908, for extension of sewers in Fisk avenue and Gorham street. The time limit of the latter permit has now expired and, therefore, the use of all sewer extensions constructed since 1905 are in violation of the Public Health Law.

Flow of outlet and dilution factors

Canandaigua lake at its outlet has a watershed of about 188 square miles and a surface area of about .16 square miles. The outlet has two channels for about two miles, the old outlet which is very winding, leaves the lake about ½ mile east of the foot of Main street and the new outlet or canal which leaves the lake at the foot of Main street. The flow through both outlets is controlled by stop planks and during periods of low flow all water is passed through the new outlet on account of sewage and trade wastes which are discharged into it.

The minimum average daily flow for a month during the years 1912 to 1916 inclusive, obtained from records of flow of Canandaigua outlet at Alloway reduced proportionally to the area of watershed at Canandaigua are as follows:

August, 1912–62; September, 1913–24; October, 1914–45; and June, 1915–44; October, 1916–19 cubic feet per second. At the time of the inspection the flow at Canandaigua was estimated at about 40 cubic feet per second, and these figures are approximated by the readings at Alloway. The average daily flow for 14 days of October, 1916, was only about 13 cubic feet per second as shown by the records of flow at Alloway.

The flow of 40 cubic feet per second as found during the inspection gave a dilution factor of about 5.3 cubic feet per thousand population which is about the minimum ratio of pollution before actual putrefactive conditions of the flowing water takes place. During the low average flow of 24 cubic feet per second of September, 1913, and of 19 cubic feet during October of this year the ratio of dilution was only about half of that found during the inspection and this condition of nuisance along the outlet must have been much worse than during the inspection.

Manufacturing establishments whose trade wastes have more or less effect upon the question of stream pollution of the Canandaigua outlet at Canandaigua

(1) *Lisk Manufacturing Company,* manufacturers of tin and metal ware. This factory is located in the eastern part of the city and nearly 500 persons are employed there. The daily water consumption is about 13,200 gallons. All iron ware is pickled in an acid bath before being galvanized or enameled. The acid bath is a 5 per cent H_2SO_4 solution and it is used until very weak, at which time the tank is emptied and the contents discharged into the drain leading to the outlet. These wastes are discharged into the outlet with practically no sedimentation and at the time of the inspection oxide of iron could be seen in the wastes and a sample collected and tested contained 7 parts of iron per million.

(2) *Canandaigua Gas Light Company,* manufacturers of illuminating gas. The gas plant is located on Main street near the outlet and uses about 8 tons of coal per day. The by-products are coke and coal tar. The gases driven off from the coal are passed through the waterseal where most of the coal tar and the various ammonia compounds are removed. The gases are then passed through various washers and scrubbers to further purify the gas for illumination purposes. The ammoniacal or gas liquors are discharged directly into the outlet carrying with them most of the various nitrogen compounds and some coal tar. Coal tar was seen on the bottom of the ditch through which the water passes, gradually moving toward the outlet. Some of the lighter oils which had separated from the wastes upon cooling could be seen upon the surface. From results of tests of a coal gas plant at Providence it was found that about 13.17 gallons of coal tar and 5.01 pounds of ammonia were obtained per gross ton of coal converted. This would represent approximately 80 gallons of coal tar and 30 pounds of ammonia produced per day at Canandaigua. All of the ammonia and part of the coal tar and lighter oils are now discharged into the outlet.

(3) *New York State Railways, Car Barns, Repair Shop, etc.*— Wastes consist chiefly of water from floors, cars, etc., and oil from machinery. Wastes discharged into same ditch into which wastes from gas works are discharged.

General Condition of Outlet at Time of Inspection.—At the time of the inspection the weather was clear with a slight wind, the temperature about 75° and the humidity was low. Above Main street the water was clear and apparently unpolluted.

Below the discharge of sewage from the west side system the water became turbid and of a dirty white color showing the presence of the sewage. The addition of wastes from the gas works and car houses turned the color slightly darker and oil was seen on the surface.

Below the discharge of sewage from the east side system the water in the outlet had much the same appearance although more turbid and slightly darker.

At Robinson's about 1½ miles below Saltonstall street the water was darker and considerable sludge and mud was deposited in the quieter parts of the outlet. Odor was noticeable near the stream and people living nearby stated that at times the odors were very unpleasant. Gas bubbles could be seen rising to the surface from deposits on the bottom showing the putrefactive condition of the deposits.

At Chapin, 4 miles below Canandaigua, the dam had been removed and the water in the outlet generally flows quite rapidly through the village. Some sludge deposits were seen in the more sluggish portions of the stream and an odor of sewage was noticed near its banks. Residents at Chapin stated that at times the odors of sewage were very noticeable in the village.

At Littleville is a large mill pond much of which has become filled with mud deposits. This pond produces conditions similar to a large settling tank and permits the heavy settling matter in the sewage to be deposited on the bottom of the pond. Due to the storage received it also permits the water to become septic during periods of low flow when putrefied sludge arises from the bottom and passes over a dam to the waters below. The odor of sewage was quite apparent here.

At Shortsville, 3 miles below Chapin, the water, while in better condition than at Robinson and Chapin, due to storage received at the Littleville and Shortsville dams, was quite turbid, and had a slight odor of sewage. Some gas could be seen rising to the surface from deposits on the bottom of the pond.

In order to determine the actual condition of the outlet water above and various places below the discharge of sewage, and of the sewage, various samples were collected and analyzed. These analyses included the temperature of the sample and tests for turbidity, oxygen consumed, dissolved oxygen, nitrates, chlorine, putrescibility and bacteria, and the results are shown in the following table:

RESULTS OF ANALYSES OF SEWAGE AND OF OUTLET WATER ABOVE AND BELOW DISCHARGE OF SEWAGE MADE ON AUGUST 11, 1916

LOCATION	Temperature	Parts Per Million						Putrescibility days	Bacteria 20° agar
		Turbidity	Oxygen consumed 10 min. boil	Dissolved Oxygen		Nitrates	Chlorine		
				Parts	Per cent of saturation				
Raw sewage	68°	400	74.	.....	.....	.....	110.	4 hrs.	3,050,000
Lake water	72°	Cl.	2.6	3.6	40	.....	.35	Over 20	95
Robinson's	74°	64.	5.1	3.0	35	.....	5.	8 days	19,000
Chapin Brdg	74°	60.	4.1	3.0	35	.....	4.5	Over 20	14,000
Littleville	75°	45.	4.5	3.7	43	.....	4.5	Over 20	4,900
Shortsville above dam	75°	30.	4.1	4.2	49	0.2	3.5	Over 20	10,000

While one set of analyses cannot be considered as showing necessarily the average conditions of the sewage and of the water above and below the discharge of sewage, yet they do show the conditions at the time of the inspection which were as follows:

The raw sewage was of about the average strength of sewage from a city of its size as shown by the turbidity, oxygen consumed, chlorine and bacterial count. The absence of dissolved oxygen and the results of the putrescibility test show that the sewage was in a septic condition as discharged into the outlet. The high count of bacteria is about what could be expected of septic sewage from the city.

The lake water was clear, had 2.6 parts of oxygen consumed and about 40 per cent saturation of dissolved oxygen. The low chlorine content and small bacterial count showed that the water had received little or no pollution.

The sample collected at Robinson's which is at the railroad bridge about 1½ miles below Saltonstall street, had a turbidity of 65 parts and an oxygen consumed content of 5.1 parts. These tests, together with the 5 parts of chlorine and the high bacterial count plainly showed the presence of sewage. The results of the putrescibility test of 8 days showed that the dilution was insufficient to prevent the sample from putrefying. Dissolved oxygen was present to the extent of about 35 per cent of saturation.

The sample collected at Chapin had a turbidity of 60 as compared with that of 65 at Robinson's and the oxygen consumed test showed 4.1 parts as compared with 5.1 at Robinson's. These results showed that some of the suspended matter had settled out between the two sampling stations. The dissolved oxygen was the same as that found at Robinson's. In the chlorine test 4½ parts were found as compared with the 5 parts at Robinson's. The bacterial count was somewhat smaller and the sample was apparently stable.

At Littleville a turbidity of 45 parts was obtained showing a removal of about 25 per cent of the suspended matter due to the storage in the mill pond. The oxygen consumed had increased slightly from that at Chapin and this may have been due to some organic matter from the bottom of the pond. The amounts of dissolved oxygen had increased slightly due to aeration at the dam. The chlorine content was the same as that found at Chapin. The bacterial count was much lower and the sample was stable as shown by the putrescibility test.

Finally at Shortsville the turbidity had been reduced to 30 parts, showing a reduction of 33 per cent due to settling in the mill pond and to additional dilution from small streams. The oxygen consumed was the same as that found at Chapin. Chlorine was reduced to 3.5 parts and dissolved oxygen had increased to nearly 50 per cent saturation. The total count in the sample was somewhat greater than at Littleville. The nitrates were very low only showing 0.2 parts.

Summary and conclusions

As a result of this investigation and after a careful consideration of the condition of the stream above and below the points of pollution and of the amount of flow necessary to properly care for the quantity of sewage and other wastes discharged into Canandaigua outlet at Canandaigua the following summary and conclusions are presented:

1. That owing to the large amount of domestic sewage and trade wastes discharged into the Canandaigua outlet from Canandaigua and to the comparatively low flow of water through the outlet during the summer and fall months a public nuisance is created as shown by the inspection, which condition of nuisance would be intensified at times when the flow through the outlet is less than that found during the inspection.

2. That the nuisance is due largely to the domestic sewage from Canandaigua and to a lesser extent to trade wastes from the plants of the Canandaigua Gas Light Co., the Lisk Mfg. Co., and the New York State Railways.

Recommendations

1. That in view of the above I would recommend that the city of Canandaigua be required to submit plans for and construct within a reasonable time proper sewage disposal works to treat the sewage discharged by the city. The plans should include treatment both by sedimentation and filtration or methods equally satisfactory and the sedimentation tanks should be constructed at once while the construction of the filters may be deferred until such time as the Commissioner of Health shall deem necessary.

2. That the Canandaigua Gas Light Company be required to connect with the city sewer system or to construct a sedimentation tank suitable in size to prevent coal tar and oil from passing into the stream and that they consider the advisability of recovering ammonia from the gas liquors or otherwise make provisions for preventing the present polluting wastes from entering the stream. Plans for such settling tank should be submitted to this Department for approval.

3. That the Lisk Mfg. Co. be required to connect with the city sewer system or to construct a settling tank or tanks sufficiently large to give a three-hour detention period during the time of maximum flow

of wastes or both and that they consider the advisability of constructing a ferrous sulphate recovery plant or that they otherwise make provisions for preventing the pollution now caused by their wastes. Plans for settling tanks should be submitted to this Department for approval.

4. That the New York State Railways Company be required to connect with the city sewer system or to construct a settling tank sufficient in size to remove all grit and oil from the wastes now being discharged into the outlet or that they otherwise satisfactorily dispose of these wastes. Plans for a settling tank should be submitted to this Department for approval.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 14, 1916

On February 17, 1917, copies of this report were transmitted to the city authorities and to the various concerns noted above and they were asked to take steps to carry out the recommendations of the report.

CASTLETON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation made in regard to sewerage conditions in the village of Castleton, town of Schodack, Rensselaer county. The inspection was made on May 4, 1917, by Mr. Albert I. Howd, Inspecting Engineer in this Department, as a result of complaints received by this Department in regard to insanitary conditions due to the improper disposal of sewage of the village.

In connection with an inspection of an alleged nuisance at Castleton in July, 1912, an investigation was made of existing sewerage conditions of the village. In the report upon that investigation it was recommended that "the attention of the village board of health be called to the desirability of having prepared a plan for a general system of sanitary sewers and sewage disposal to be presented to this Department for approval."

Castleton is located in the southwestern part of Rensselaer county on the east bank of the Hudson river. It is on the main line of the New York Central and Hudson River Railroad, 9 miles south of the city of Albany. The village is situated on rolling land, rising in parts to a considerable height above the river. The soil is clayey loam on top underlaid by blue clay. The population, according to the census of 1915, is 1,583, an increase of 187 since 1910. The village is provided with a public water supply derived from a stream fed by springs about 7 miles east of the village. Electric lights, gas and other modern facilities are available.

No comprehensive system of sewerage has been built in Castleton. The rapid concentration of rain water due to the steepness of many of the streets has made storm water sewers necessary. Several of these have been installed by the village and as unfortunately sometimes happens in municipalities where a public water supply is available but where no sanitary sewers have been installed, house connections have been made with the storm water sewers. In the eastern part of the village the ground surface is steep, rising to a considerable height above the river, the runoff from which passes through the village.

It was estimated that 50 per cent of the houses in Castleton have flush closets, a percentage which is increasing, especially in that part of the village which is now being built up with modern houses. In some of these streets, such as Chestnut and Willow streets, storm sewers have been laid and flush closets have been connected with them. In several cases the in-

spector questioned at houses which had no privies and in each case he was informed that flush closets were used which were connected with a storm sewer. The inspector was informed that there are few cesspools in the village, which indicates that most of the flush closets are connected with the storm sewers.

In Main street, which extends parallel to the river, a storm sewer was laid about 3 years ago, previous to a State highway being constructed through the village, and at that time about half the houses on Main street connected with it. Previous to the installing of this storm sewer one of two general methods was used by the people in disposing of their sewage. Either private drains discharging into the river were used or private drains discharging into one of the storm sewers coming down Green, Stimson, Scott and Seaman avenues where it passed through Main street. On May 13, 1913, Mr. Gardiner, engineer, representing the village, called at the Department, at which time he stated that this drain was then proposed to be constructed on Main street but was not to be used except for storm water and that the village authorities understood the limitations of sewer construction in this respect and the rulings of this Department under the Public Health Law. He was notified that if it was found later that any sewage was being discharged into this storm sewer the persons responsible for same would be liable for the penalties provided by the Public Health Law for this violation. Mr. Charles Lebrecht, president of the Board of Health, was informed of the result of Mr. Gardiner's visit and he was also notified that no sewage should be discharged into this storm water drain in Main street. The present use of this storm sewer in Main street, therefore, constitutes a direct violation of the Public Health Law, a situation concerning which the village representatives had prior notification.

The inlets of the storm sewers consist of vertical tile or brick pipes covered with iron bar grating placed in the gutter of the earth roads. On the hillsides, in many cases, the bell mouth of an 8-inch or 10-inch tile pipe laid on a slant and backed by a mound of earth, is generally used. A resident of Main street informed the inspector that often in the summer the odor rising from one of these vertical inlet pipes near his house is so offensive that the porch cannot be used by him and his family.

The outlets of the storm sewers in the case of Scott and Stimson avenues are iron pipes laid under the railroad embankment, while the Green and Seaman avenue sewer outlets are masonry culverts. In each case the outlet is at the high water mark and the sewage flows across the beach at low tide. Besides these outlets there are numerous smaller pipes scattered along the river banks which are drains from private houses and stores on Main street. The discharges from these outlets were dirty gray and considerable paper was noticeable. The appearance and odor of the above indicated that water closets and kitchen wastes were being discharged into the storm sewers and pipe drains.

Mr. George S. Schermerhorn, village clerk, with whom the inspector talked, stated that out of the population of nearly 1,600 people, about 150 houses were connected with the storm sewers, and that 250 to 275 houses were supplied with public water, none of which are metered. Hence approximately 50 per cent of the houses are connected with storm sewers and about 90 per cent are connected with the public water supply.

Therefore, the need of a system of sewerage for the village of Castleton is made very evident. The inspector was informed that no steps have as yet been taken by the village authorities toward the preparation of plans for sanitary sewers and sewage disposal works to be submitted to this Department for approval as provided by the Public Health Law. It is apparent that in order to relieve the present conditions in a permanent manner, this work should be undertaken at as early a date as possible.

I, therefore, recommend that the village authorities be informed of the result of this inspection and that they be advised to immediately employ a competent engineer to prepare the plans for a comprehensive system of sewerage and sewage disposal works for the village of Castleton.

I further recommend that copies of this report be submitted to the trustees

of the village of Castleton for presentation to the village board and that a copy be sent to the Health Officer, to the Sanitary Supervisor for the district, and to the complainant, and that the village authorities be urged to take steps at once to carry out the recommendations of this report.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 8, 1917

Copies of this report were transmitted to the village authorities and to the local Board of Health, urging that the recommendations of the report be carried out.

CLAVERACK (town)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an inspection in regard to the disposal of sewage from the residence of Mrs. M. S. Sheldon in the unincorporated village of Mellenville, town of Claverack, Columbia county, with special reference to the pollution of a spring used for water supply. The inspection was made in January 6, 1917, by Mr. C. A. Howland, assistant engineer, in company with Dr. G. W. Vedder, Health Officer of the town of Claverack.

This matter was brought to the attention of this Department through correspondence and through a report of the Health Officer, in which it was stated that the local Board of Health ordered Mr. Sheldon not to use the cesspool constructed to receive the sewage from her house. The engineer was informed that permission to discharge sink wastes into the cesspool was afterward given. In a later communication from the Health Officer it was requested that an investigation be made by a representative of this Department.

The recently constructed house of Mrs. M. S. Sheldon is situated upon a hillside which slopes steeply to a flat area bordering North Creek. A large cesspool was dug in the gravelly slope west of the house to dispose of the sewage from the building, in which 5 people will live. The cesspool which is about 10 feet by 10 feet in plan and 8 feet deep, extends into a stratum of gravel.

About 40 feet below the cesspool is located a spring in a depression near the point where a roadway leading to a baseball park branches from the main highway. The spring, which consists of a triangular wooden box covered by a loose wooden cover, is situated on property owned by Mr. Bidwell, who does not use it for potable purposes. A culvert under the main highway near the spring carries the runoff from a ravine near the banks of which are located a number of privies. The engineer was informed that the spring is flooded by surface wash at certain times of the year and that at other times the yield of the spring is very low indicating that the flow is dependent on a comparatively small catchment area. It was also stated that live stock are pastured near the spring and drink from it.

The engineer talked with Mr. Van der Poel who lives across the road below the spring and was informed that disagreeable odors became noticeable in the waters from his well, and for that reason it is not used, but water is obtained either from the spring above described or from a well on premises across the road. A privy, having a dug vault, is located about 45 feet from the well on ground practically level with the well and a chicken yard and barn near which is a large manure pile are located in the rear of the Van der Poel house.

The engineer also talked with Mrs. Coleman who lives west of the spring on the same side of the road. Water for her house is obtained from a well located a few feet east of the house and although no objectionable qualities have been discovered in this water, Mrs. Coleman feared that the pollution of the spring by sewage from the cesspool on the Sheldon premises would result in pollution of her well. The well is a dug well, 14 feet deep and the

curbing is cracked so that surface water would wash into it. A privy, having a shallow vault, is situated near the well but at a slightly lower elevation.

In view of the results of this inspection it appears that the spring situated below the cesspool constructed to receive the sewage from the residence of Mrs. M. S. Sheldon in the village of Mellenville is subject to pollution from surface wash both from roads and pasture land and also from the ravine above it. It also appears very probable that seepage from the cesspool would reach the spring. The wells on the premises of Mr. Van der Poel and Mrs. Coleman are also subject to pollution from a number of sources. The use of both the spring and wells is, therefore, dangerous under present conditions.

Only a general removal of the sources of pollution and a general abandonment of the polluted water supplies will remove the danger of a serious epidemic of disease being caused by the use of infected water. The village should, therefore, install a public supply of safe and wholesome water and a system of sewerage and sewage disposal.

Until such time as a public water supply and sewerage and sewage disposal system are installed every precaution should be taken to safeguard the sources of water supply which are used. To render its water safe the spring should be properly protected against surface wash by the construction of an impervious curbing of concrete or other material to be provided with a tight cover which may be locked to prevent accidental or wilful pollution by persons passing along the road. The use of the spring for watering live stock should be prohibited. Even with such protection it is probable that the pollution of the ground water above the spring by privies near the ravine and other sources will make the water unsafe for potable purposes. In fact the adequate protection of the spring presents many difficulties and in any case it is doubtful if an adequate supply will be obtained since the engineer was informed that the flow of water is small at certain times of the year. The spring is too low to be piped into the house where it is used and, therefore, it will be necessary to carry the water or pump it.

As pointed out above the wells on the Van der Poel and Coleman premises are subject to dangerous pollution. It would appear that the sources of this pollution could be removed and the water be made safe for potable purposes. A supply which is much more conveniently located and which is adequate would thereby be obtained. There is apparently little probability that the Coleman well will be polluted by a cesspool on the Sheldon premises especially in view of the fact that there is a watercourse between the cesspool and the well.

In view of the factors to be considered in this matter, pointed out above, I beg to recommend that the residents of Mellenville be advised to install a public water supply and system of sewerage and sewage disposal at the earliest possible moment. I would recommend further that until such systems are installed every effort be made to protect the sources of water supply which are now used, from contamination and that until these sources are made safe, the water derived from them be boiled before it is used for potable purposes. As the protection of the above-described spring is a matter which would be of doubtful economy and of considerable difficulty, I would recommend that its use for potable purposes be discontinued. I would recommend also that Mrs. M. S. Sheldon be allowed to use the cesspool built to receive the sewage from her house on condition that if it is found that conditions which are obnoxious or dangerous to health are produced it be abandoned. In conclusion I would recommend that copies be transmitted to the local Board of Health, to Mrs. M. S. Sheldon, Mr. W. S. Van der Poel and to Mrs. M. Coleman and they be advised to take steps at once to carry out the recommendations of the report.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 19, 1917

Copies of this report were transmitted to the local Board of Health and the persons noted above, asking them to take steps to carry out the recommendations of the report.

DEPEW

Memorandum regarding defective sewerage

Mr. Cleveland visited Depew on March 22 to inspect sewerage conditions in Olmstead avenue in response to a petition received from residents of Olmstead avenue and Grant avenue regarding the flooding of cellars by sewage.

The locality was inspected in company with the Health Officer, Dr. J. A. Klahs, and conferences were held with the principal complainant, Mr. George H. Patterson of No. 6 Grant avenue, Mr. Cornelius Gibbs, village president, and Mr. George C. Diehl, village engineer.

It was found that the layout of streets had been changed somewhat from that shown by the plans for sewers approved in 1896 and that Olmstead avenue is located about 150 feet north of the N. Y. C. R. R. shop property to give room for a row of lots on the southerly side of Olmstead avenue; also that Grant avenue had been opened, intersecting Olmstead avenue at an angle near the point where the main branch of Scajaqua creek is crossed by Olmstead avenue.

Grant avenue is built up for only a short distance east of its intersection with Olmstead avenue and the four houses on Grant avenue have sewer connections leading to the Olmstead avenue sewer.

The sewers in this district have been built about 5 years and residents of Grant avenue stated that for 4 years no trouble had been experienced from the sewage backing up. In January, 1916, however, sewage backed up in the cellars and at intervals since then, although cleaning by the superintendent of streets has relieved conditions. In January of the present year sewage backed up in Mr. Patterson's cellars to a depth of 1½ feet as indicated by the water marks left in the cellar. The sewer was flushed at that time by the superintendent of streets and has backed up only once since, though not seriously.

An inspection was made of the sewer from Grant avenue to the Transit road sewer to which it is tributary and 4 or 5 manhole covers were lifted. It was found that the Olmstead avenue sewer which is laid on a gradient of about 0.5 per cent had a normal depth of flow through the manholes except at the third manhole west of Grant avenue and at the Transit road manhole. At the third manhole west of Grant avenue the outlet pipe was flowing nearly full and at the Transit road manhole the sewage was standing in the manhole to such a depth as to entirely cover the inlet and outlet sewers.

The property north of Olmstead avenue between Grant avenue and Transit road has never been developed as a result, together with the fact that the sewer in Olmstead avenue is laid inside the north curb line, the tops of the manhole covers are from 2 to 3 feet below grade at several points. This permits pools of surface water to collect over these manholes with the resulting entrance into the sewer through the perforations in the manhole covers of surface water carrying considerable silt.

It is evident that this condition is what causes the backing up of the sewage during rains or freshets.

The matter was taken up with the village president and he agreed, at Mr. Cleveland's suggestion, to have the village engineer inspect the Olmstead avenue sewer and determine definitely what causes the stoppage and then to have the sewer repaired or such work done as would relieve conditions.

Mr. Cleveland also conferred with Mr. George C. Diehl, the village engineer, to whom it was pointed out that a study should be made of necessary reconstructions to improve the sewerage facilities in this street and to stop the backing up of the sewage, possibly necessitating merely the raising of the manholes above grade to prevent silt from being washed into the sewers.

Mr. Diehl stated that the matter would be attended to at once and Mr.

Cleveland advised him that the village president had also agreed to see that the conditions were remedied.

A letter was later addressed to the village authorities calling their attention to the defective sewerage conditions.

ALBANY, N. Y., *March* 23, 1917

JOHNSTOWN

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation made of the pollution of Cayadutta creek by the discharge of sewage and mill wastes from the city of Johnstown, Fulton county, made on October 26 and 27, 1916, by Mr. M. F. Sanborn, assistant engineer.

Complaints have been made at various times in the past by persons living along the creek below the discharge of sewage and mill wastes from the city of Johnstown and this investigation was made to determine the amount and character of the pollution. During the investigation the situation was gone over with Hon. B. D. Smith, mayor; Mr. F. Moyer, attorney of the city; Mr. W. E. Natanson, city engineer; Mr. D. B. Abrams, supervisor of the town of Johnstown; Dr. F. G. Calder, Health Officer of the city; and Dr. R. J. Palmer, Health Officer of the town.

Johnstown is a city of about 10,800 inhabitants. There has been a slow increase in population as shown by the census, there being 10,130 in 1900; 10,447 in 1910 and 10,687 in 1915. It is located adjacent to and southwest of the city of Gloversville and about 11 miles northwest of Amsterdam. The Fonda, Johnstown and Gloversville railroad from Schenectady and Fonda passes through the city. Johnstown is the county seat of Fulton county and is largely a manufacturing city, it having many glove factories and other industries.

The public water supply of the city is obtained from several brooks from 3 to 5 miles northwest of the city. This is a gravity supply and is under the control of the Board of Water Commissioners. About 95 per cent or 10,260 of the inhabitants, are served by this supply. The average daily water consumption is about 2,500,000 gallons which corresponds to a per capita daily consumption of about 230 gallons. The above consumption, however, includes about 532,000 gallons used daily at the various industries and deducting this amount will give a per capita consumption of about 182 gallons.

Cayadutta creek rises north of Gloversville and passes through the cities of Gloversville, population 21,200, and Johnstown, the village of Sammonsville, population 300, and enters the Mohawk river in the western part of the village of Fonda, population 1,120. Johnstown is about 3 miles above Sammonsville and 7 miles above Fonda measured along the course of the stream.

Previous to 1911 the sewage of Gloversville as well as the trade wastes from the various factories in the city were discharged into Cayadutta creek but since the construction of the Gloversville sewage disposal plant, consisting of settling tanks, sprinkling filters, secondary settling tanks, sand filters and sludge beds, in 1911, all of the sewage and most of the trade wastes have passed through the disposal plant. The sewage of Johnstown as well as the trade wastes are discharged into the creek. During the last 2 years settling tanks were constructed at many of the factories to remove the heavier suspended solids before the settled wastes were discharged into the creek or sewer system.

On May 2, 1910, June 29, 1910, August 20, 1910, August 23, 1910, and December 2, 1910, plans were approved by this Department for a trunk sewer and various extensions and all permits contained a provision that "On or before June 1, 1911, complete detailed plans satisfactory to this Department for the purification of the entire sanitary sewage of the city shall be

submitted; and that the construction of any or all portions of the sewage disposal works shown by said plans shall thereafter be undertaken when required by the State Commissioner of Health and be completed within the time limit set by said Commissioner." The above requirements were not complied with and on May 15, 1912, and May 28, 1912, additional permits were issued by this Department to the city of Johnstown which extended the time of submitting the complete detailed plans satisfactory to this Department to March 1, 1913. The plans called for in the above permit have not as yet been submitted to this Department and, therefore, the discharge of sewage from the main interceptor and various sewer extensions is in violation of the Public Health Law.

The sewer system consisted originally of various local combined sewers which discharged into Cayadutta creek at various points. In 1910 and 1911 an intercepting sewer was constructed alongside of Cayadutta creek extending from near the upper side of the city to about 700 feet below Montgomery street. This sewer receives the sewage from about 90 per cent of the total population while Thynerville trunk sewer which discharges into the creek about 2,800 feet below the discharge of sewage from the main trunk sewer receives the sewage from about 8 per cent of the total population.

The population served by the sewers is, therefore, about 10,580 which is about 98 per cent of the total. The average daily amount of sewage from various sources as estimated by the city engineer was as follows:

	Gallons
Domestic	1,750,000
Manufacturing wastes, tanneries, etc	500,000
Roof and catch basin water	750,000
Infiltration of ground water	150,000
Total	3,150,000

The amount will of course vary considerably depending upon the amount of rain and elevation of ground water. The present system is largely on the separate plan, there being about 24.2 miles of sanitary sewers from 8 to 30 inches in diameter and about 1¼ miles of storm sewers from 12 to 30 inches in size. The sanitary sewers receive the domestic sewage, much of the manufacturing wastes, surface drainage from 12 street catch basins and roof water from 282 roofs.

Cayadutta creek above the main sewer outlet has a watershed of about 36⅔ square miles. During the inspection the flow in the creek at the main sewer outlet was estimated at about 23 cubic feet per second. This corresponds to about .61 cubic feet per second per square mile. The average low flow in the creek was estimated by several persons interviewed to be about ½ of that found during the inspection which would be about 11½ cubic feet per second or .30 cubic feet per second per square mile. The amount of sewage discharged from the city of Johnstown during the inspection would have a dilution factor of about 2.17 cubic feet per 1,000 population contributing sewage while during the average minimum flow in the creek the dilution factor would be only about 1.08 cubic feet per 1,000 population. The minimum dilution factor generally found to be necessary to prevent putrefactive conditions from being set up is about 5 cubic feet per second per 1,000 population contributing sewage. In this case the dilution factor is only a fraction of the minimum necessary and with the strong wastes from the various industries the sanitary conditions of the stream would be much worse. The flow in the creek is somewhat irregular due to storage of water in the various mill ponds for water power purposes. The total fall in the stream from Johnstown to the Mohawk river is about 300 feet in about 8 miles which means that the waters receive considerable aeration and thus the dilution factor can be somewhat less than the ordinary minimum before putrefactive conditions would exist in the stream at points well removed from the city.

There are about 20 tanneries and leather dressing establishments in Johnstown employing about 1,200 people. About 6,000,000 pounds of hides are handled each year. It was estimated that about 6,400,000 pounds of salt, lime, alum, logwood and various other dyes, fish oils, egg yolks, acids and many other chemicals are used each year. About half of the above materials and chemicals eventually finds its way into the sewer system or directly into the creek. Settling tanks have been installed at most of the factories to remove the settleable solid matter before the wastes are discharged into the city sewers.

There are four large mills not yet connected to the sewer system, namely, Johnstown, Mocha Mills, Argetsinger Mills, Kings Mills, and the Johnstown Glue Company plant. The wastes from the first two mills can readily be discharged into the city sewers while the last two are some distance from any existing sewers. The City Board of Health has ordered that settling tanks be constructed at all mills to remove the readily settling solids from the wastes before the discharge of the wastes into the creek or into the city sewers. The city plumbing inspector visits the different mills each week to observe the condition of the settling tanks and the amount of sludge removed from the tanks. The tanks are cleaned out about once a month and on an average of about 4 or 5 cubic yards of sludge are removed at each cleaning.

General conditions of Cayadutta creek at time of inspection

At the time of the inspection the weather was clear, with a slight wind, temperature about 45 and the humidity was low. In the upper part of the city the creek water was somewhat colored, apparently due to the coloring matter in the trade wastes from the city of Gloversville.

In the lower part of the city and above the discharge of the sewage from the main intercepting sewer the water was colored due to the trade wastes and much sludge could be seen in portions of the creek apparently due to trade wastes which are discharged directly into the creek.

At the iron bridge one mile below the main discharge of sewage, the water was quite turbid and considerably darker than above the discharge of the sewage. Considerable sludge was seen in the quieter parts of the creek and gas could be seen rising to the surface. Odors were quite noticeable near the creek.

In the pond above the dam which is about ¾ of a mile below the iron bridge, the water was dark and gas bubbles could be seen rising to the surface from the sludge. Much of the pond was filled with sludge and Mr. Brown, chief engineer at the electric generator station of the Fulton Gas and Electric Company, stated that, "Odors were very bad at times and that during the 22 years he had been at the plant the pond formed by the dam for water power purposes had become nearly filled with sludge. At first they could draw the pond down 10 feet while now it can be lowered only about 5 feet since this draft leaves only a narrow channel through the pond." Odors of septic sewage were noticed near the creek.

At Sammonsville the water had cleared up somewhat due to the removal of some of the solids in the ponds above and to the almost constant aeration the water receives. Some odors were however noticeable, and the residents of the village stated that at time the odors were very unpleasant.

At the highway bridge 2 miles below Sammonsville the water had cleared considerably and odors of sewage were hardly noticeable at the time of inspection. The appearance of the bed of the creek was also much better.

At a point about 1 mile above the Mohawk river the creek water was comparatively clear and no odors of sewage were noticeable.

In order to determine the actual condition of pollution of Cayadutta creek, samples of the creek water were collected above and below the discharge of trade wastes and sewage and analyzed. These analyses included temperature of the water and of tests for turbidity, oxygen consumed, dissolved oxygen, chlorine, putrescibility and bacteria and the results are shown in the following table:

RESULTS OF ANALYSES OF SEWAGE AND CREEK WASTE ABOVE AND BELOW THE DISCHARGE OF TRADE WASTES AND SEWAGE FROM CITY OF JOHNSTOWN, OCTOBER 27, 1916.

LOCATION	Temperature	PARTS PER MILLION						
		Turbidity	Oxygen consumed 10 min. boil	DISSOLVED OXYGEN		Chlorine	Putrescibility days	Bacteria
				Parts	Per cent of saturation			
Creek water 1 mile below Gloversville	50	30	53.3	7.3	64	97.5	.....	66,000
Creek water above discharge of sewage at Johnstown	48	30	42	9.5	82	11.0	5	1,200,000
Raw sewage	56	200	116	4.0	38	225.0	½	1,800,000
Iron bridge 1 mile below discharge of sewage	50	75	48	8.5	75	50.0	1	445,000
At bend 1 mile below iron bridge	46	*30	20	5.0	42	50.0	2½	4,475,000
Sammonsville	46	*30	20	5.4	46	80.0	2	2,780,000
At bridge 2 miles below Sammonsville	.....	*30	14	.....	.....	70.0	.....	765,000
1 mile above Mohawk river	.....	*30	10	.....	.....	55.0	.....	75,000

* Less than 30.

While one set of analyses cannot be considered as showing necessarily the average conditions of the sewage and of the creek water above and below the city yet they do show the conditions at the time of the inspection which were as follows:

The raw sewage appeared to be somewhat stronger than that of the average sewage of a city of the size of Johnstown and this is probably due to the large amount of trade wastes which are discharged into the sewer system. The high amount of chlorine shown in the analyses is undoubtedly due to the trade wastes. The sample was putrescible in ½ day and the total count of bacteria was about the same as that of an average raw sewage.

The creek water taken at a point ¼ mile below the boundary line between Gloversville and Johnstown was somewhat turbid. The high oxygen consumed value and the high chlorine are undoubtedly due to the trade wastes from the factories in Gloversville and to the effluent from the disposal plant of Gloversville. The total count of bacteria in the sample tested was 66,000 per c.c.

The sample collected at the lower part of Johnstown and just above the discharge of sewage from the intercepting sewer showed that the brook water had received some additional pollution as it passed through the city. Part of this, however, had apparently been somewhat reduced due to the added dilutions received by the waters of the various streams which enter the main creek in Johnstown. This sample showed a very high count of bacteria and was putrescible in 5 days which indicated that if it was not for the large amount of aeration the creek water receives the present amount of trade wastes discharged into the creek would very soon cause a nuisance.

The sample collected near the iron bridge about 1 mile below the discharge of the sewage from the main intercepting sewer had a turbidity considerably higher than that of the creek water above the discharge of the sewage. The oxygen consumed and the chlorine test also plainly indicated the presence of the sewage. The sample was putrescible in one day and showed conditions but little better than that of the raw sewage. The total count of bacteria was somewhat less than that of the creek water above and of the raw sewage.

A sample taken about one mile below the iron bridge and a short distance below the mill dam at the electric light station showed a considerable reduction in turbidity and oxygen consumed. This sample was putrescible

in 2½ days and gave a total count of bacteria of nearly 4,500,000 per c.c. The reduction in oxygen consumed and turbidity was undoubtedly due largely to the sedimentation the sewage and wastes received in the mill pond above, while the increase in bacteria was undoubtedly due to the fact that opportunity has been provided for the growth of bacteria in the water.

The sample collected at Sammonsville gave about the same results as that 1 mile below the iron bridge, although the number of bacteria had been reduced about 45 per cent. This sample was putrescible in 2 days and indicated that a nuisance would very readily be created if the waters were not receiving almost constant aeration.

The sample collected at a bridge about 2 miles below Sammonsville showed further reduction in oxygen consumed and bacteria and this is due to the additional dilution received to sedimentation in the various mill ponds and to the oxidation of part of the organic matter.

The sample taken at a point about 1 mile above the Mohawk river showed a still further reduction in oxygen consumed, chlorine and bacteria. These last results indicated that the waters were also in a much better shape and in fact a large part of the conditions of pollution which are apt to cause a nuisance had been eliminated from the creek water by natural processes of purification and by dilution.

Summary and conclusions

As a result of this investigation and after a careful consideration of the condition of the stream above and below the points of pollution in the city of Johnstown and of the amount of flow necessary to properly care for the quantity of sewage and trade wastes discharged into Cayadutta Creek at Johnstown the following summary and conclusions are presented:

1. That the discharge of raw sewage and trade wastes from the city of Johnstown creates a considerable nuisance. The existence of this nuisance is fully corroborated by the results of the chemical analyses and is evidenced by the putrefactive condition of the sludge deposited in the various ponds and deeper portions of the creek and by the odors resulting therefrom. This condition of nuisance while distinctly apparent during the inspection must be considerably worse during the times of low flow of the creek at which time the flow, it is estimated, is about ½ of the flow as found during the inspection.

2. That there are four factories not yet provided with settling tanks nor connected with the sewer system. Two of these factories may readily be connected to the sewer system, while it is impossible to connect the other two to the sewer system without considerable expense in the construction of additional sewers.

3. That the flow of the creek varies considerably due to the storage from the various dams in and above and below Johnstown and, therefore, the condition of nuisance would be much greater when the natural flow of water is being stored in these ponds.

4. The condition of nuisance was very noticeable from Johnstown to Sammonsville while from Sammonsville to the Mohawk river the condition gradually became better due to the natural purification the sewage was receiving and to additional dilutions from the various streams entering the main creek.

Recommendations

In view of the above conclusions I would make the following recommendations:

1. That the city of Johnstown proceed immediately to obtain satisfactory plans for a disposal plant to treat the sanitary sewage and such trade wastes as are discharged into the sewer system and that these plans be submitted within a reasonable time to this Department for

approval and after their approval that the city proceed to the construction of such portions of the disposal plant as the Commissioner of Health deems necessary.

2. That all factories which can be readily connected to the sewer system be provided with settling tanks and the settled trade wastes from these tanks be discharged into the city sewers.

3. That those factories which cannot readily be connected to the sewer system be required to construct satisfactory disposal plants for the treatment of the wastes and the plans for these works should be submitted to this Department for approval.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 26, 1917

Copies of this report were transmitted to the village authorities and local boards of health, urging them to carry out the recommendations of the report.

POUGHKEEPSIE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of sewerage conditions in the city of Poughkeepsie made by Mr. C. M. Baker, Assistant Engineer, on October 3, 1917.

The matter of sewerage in Poughkeepsie has previously been under consideration by this Department on numerous occasions, the last of which was in 1913 when plans for a complete system including an intercepting sewer and disposal plant were approved. The plans will be briefly discussed later in this report.

The present sewer system consists of combined sewers which discharge without treatment into the Hudson river through three outlets located respectively 1, 1¼ and 1¾ miles below the intake of the city waterworks. Although this system covers the greater portion of the city there are certain outlying districts and a few streets near the central portion of the city which are not provided with sewers. These unsewered sections are indicated on the accompanying map by the shaded areas, the four principal instances being designated by the letters A, B, C and D.

Section A is a well built up residential section without sewers in the southwestern part of the city which cannot be sewered into the present system without pumping. The sewage from this area, however, can be conducted by gravity to the proposed disposal plant mentioned above, or may be conveyed directly to the Hudson river by a separate gravity system. The sanitary conditions in this section are not satisfactory, there being numerous privies which are not maintained in proper sanitary condition.

Section B is a well built-up unsewered residential section in the southeastern part of the city from which it will probably be necessary to pump the sewage into the present system, as is proposed in the plans mentioned above, or for which it will be necessary to provide an independent system and disposal plant. The sanitary conditions in this section are quite satisfactory, there being few privies, the sewage from the houses being satisfactorily cared for in most cases by cesspools.

Section C is a well built unsewered residential section in the eastern part of the city to which the present system could be readily extended. The sewage and excretal wastes within this area are now mostly disposed of in cesspools, there being few privies. The sanitary conditions are generally satisfactory.

In Section D, which is a low area adjacent to the river, there are some 10

or 12 houses which are somewhat isolated and are not tributary to the present system. It was stated, however, that this land has been bought by a nearby factory which will probably extend its boundaries to include this territory and that the buildings will then be removed. Sanitary conditions in this section are unsatisfactory.

In order to present more fully the situation with respect to sewerage it seems well to briefly discuss the plans that have been approved by this Department for the sewerage of Poughkeepsie. Although these plans deal principally with disposal of the sewage, which only indirectly affects the internal sewerage of the city, they nevertheless have some bearing upon the sewerage of the unsewered outlying districts mentioned above.

Complying with previous requirements of this Department plans for sewage disposal were submitted by the city of Poughkeepsie for approval, on June 10, 1913. These plans were approved and a permit issued allowing discharge of the effluent from the disposal plant into the Hudson river, on November 10 of the same year. (See page 453, 1913 Annual Report).

The plans provide for an intercepting sewer with storm water overflow regulators extending along the east side of the New York Central Railroad, parallel to the Hudson river, to collect and convey the sewage to a disposal plant to be located near the river just southwest of the city. The preliminary treatment works are to consist of 4 Imhoff tanks and an auxiliary sludge bed for the disposal of the sludge. The general plans for more complete treatment in connection with future development include 4 additional Imhoff tanks, 4½ acres of sprinkling filters, final settling tanks and an extension of the sludge drying bed. These larger works would care for a population of 90,000 people.

In connection with these plans, however, it is proposed to pump the sewage from certain sections of the city, namely; an area of about 59 acres in the northwestern section of the city in the vicinity of Spruce street, an area of about 169 acres in the southeastern section of the city (section B on appended map and referred to above), also certain portions lying west of the proposed intercepting sewer or between it and the river. A section of about 83 acres (section "A" on appended map) in the southwestern section of the city, not tributary to the present system, is to be sewered by gravity to the proposed disposal plant. It is apparent from the above that the districts now unsewered are provided for in the proposed future development.

While not bearing directly upon the lack of sewers, it should be pointed out at this time that in certain sections of the city, where sewers are provided unsatisfactory conditions exist due to the lack of connections with the sewers and the existence of numerous insanitary privies. West of the line extending north and south through Washington and Market streets, as indicated on the map there were, at the beginning of the year 1917, 223 privies, while east of this line there were 35, thus making a total of 258 privies in the city. Prior to September 1, 127 of these privies had been removed, in addition to which orders have been issued for 164 sewer connections. The majority of the remaining privies are located in a thickly populated section of the city lying west of Washington and Market streets. This territory is populated by foreigners who do not maintain satisfactory sanitary conditions.

The permit issued in connection with the approval of the above plans provided that both the intercepting sewers and the sewage disposal works (referring to preliminary treatment works mentioned above) when constructed shall be in complete conformity with the plans; also that no storm or surface water be admitted to the proposed sewer extensions. Furthermore, it was provided that whenever required by the State Commissioner of Health detailed plans of the complete disposal works should be submitted for approval by the city and that subsequent to approval the additional disposal works be constructed at such times as designated by said commissioner. No notice to construct these works, as provided for by previous permit issued, has, as yet, been served upon the city authorities.

A matter of prime importance in connection with sewerage developments in Poughkeepsie is the protection from contamination of the public water supply

of the city. This subject was fully discussed in the report on approval of the plans for the disposal works, referred to above, the substance of this discussion being summarized in the following paragraph:

"In the case of Poughkeepsie, as has been repeatedly pointed out, there is a great need of conveying the sewage from existing outfalls to a greater distance from the water intake. The proposed plan would in general remove over 95 per cent. of the entire sewage to a point twice as far away from the point of intake, would greatly lessen the load which now has to be carried by the filter plant, would remove a considerable menace which results from any possible interference with the efficient operation of the plant and would remove from the water front opposite the central part of the city all objections surrounding the present outfalls. I do not wish to intimate that in case of any such interference the proposed plan would insure full protection against the occurrence of typhoid fever in the city, but it would certainly greatly reduce the danger that would result and furthermore, in case of emergency, the opportunity would be afforded if a disinfecting plant is installed ready for use for a disinfection of the sewage.

Nor do I wish to be misconstrued as opposing in any way the adoption of additional safeguards, such as extending the waterworks intake further up the Hudson, a measure that I have urged in former reports. As to the advisability of doing this, or of carrying out the alternative plan of taking a supply from Wappingers creek, is to my mind a very open question on sanitary as well as economical grounds, in view of the growth of population that must take place on the Wappingers creek watershed and the necessity of keeping down the pollution load on any filter plant which would obviously be required. In the early years of such a project these considerations might be serious. In future years, however, the difficulty and cost of securing ample quantity of water supply amply protected against contamination might be greater than with a supply taken from the Hudson at a point a few miles further north of the present intake.

"After carefully considering the wishes of the board of public works to omit the construction of these works at this time and notwithstanding the opinions and arguments of Mr. Hazen in the matter I am of the opinion that these works should be constructed without much delay; and would therefore recommend that in approving the plans presented you also require within a reasonable time that these works be constructed and put in operation.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer"

My viewpoint at this time is substantially the same as expressed at the time the report above referred to was written. Since that time continued improvements have been made in the construction and operation of the Poughkeepsie water filtration works, and the results and records both as to analytical data and typhoid fever statistics amply show that the present purification works are perfectly capable of handling this raw polluted water and protecting the people against typhoid infection. In my previous recommendation for comparatively early consideration of sewage disposal works I included both intercepting sewers and the sewage purification plant. I am now of the opinion, particularly in view of the excessive cost of present construction work and materials that these two factors might be well separated, and that it might be sufficient to first construct the intercepting sewers and omit until there is some pressing necessity for it, the construction of the sewage purification works.

With the installation of the intercepting sewers in the near future not only would sewerage facilities be provided for districts not now sewered, but such installation of intercepting sewers would result in the removal of the present

objectionable outlets along the river front and give an added factor of safety in lessening the load upon the water purification plant.

I am, therefore, of the opinion that the intercepting sewers should be constructed at the earliest possible opportunity.

As a result of this investigation I beg to conclude:

1. That, since certain sections of the city of Poughkeepsie are not provided with sewers (although plans heretofore approved by this Department provide for the sewerage of these sections), certain insanitary conditions exist in the central and in some of the outlying parts of the city, due to delay in the extension of the sewer system.

2. That insanitary conditions exist in certain areas in the central portion of the city, due to lack of house connections with existing sewers and the maintenance of numerous privies.

3. That the construction and operation of the proposed intercepting sewer would reduce the present load upon the water purification plant, would do away with objectionable sewage outlets along the river front and would provide means for sewering certain districts along the river front not now provided with sewerage facilities.

In view of the above I beg to offer the following recommendations:

1. That the authorities of the city of Poughkeepsie be urged to continue the work of abolishing the insanitary privies and requiring sewer connections immediately in all cases where sewers are now available.

2. That the city authorities be urged to extend the sewer system where necessary in order to provide adequate sewerage for all sections of the city as rapidly as possible.

3. That pending the construction of sewers in districts not now provided with sewers that the city authorities require that all privies and cesspools in such districts be maintained in a sanitary condition.

4. That the city authorities be urged to construct and put in operation at an early date the intercepting sewer shown by plans heretofore approved by this Department, postponing temporarily the construction of sewage disposal works until required by the Department in accordance with the terms of the permit issued.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 15, 1917

A copy of this report was sent to the city authorities and they were urged to carry out the recommendations of the report.

WATERVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation in regard to sewerage conditions in the village of Waterville, town of Sangerfield, Oneida county. The investigation was made on July 30, 1917, by Mr. A. I. Howd, Inspecting Engineer in this Department, accompanied by Mr. M. L. Condon, President and Dr. E. G. Randall, Health Officer of the village of Waterville.

The records of this Department show that the question of sewerage for Waterville was first taken up in 1889, when an investigation of the village and plans proposed for its system of sewerage was made by Mr. Charles C. Brown, Consulting Engineer to the Department, who submitted a report on the plans and conditions then existing to the State Department of Health (page 89, 10th Report). These plans were never carried out. Further investigations were made by representatives from this Department, in 1902 and 1909, as a result of insanitary conditions caused by the discharge of sewage

and wastes into Big creek. In the report upon those investigations it was recommended to the village authorities that a comprehensive sewer system be established.

Waterville is located in the southern part of Oneida county, on the Utica Division of the Delaware, Lackawanna & Western Railroad, about 22 miles south of Utica. Big creek, a small tributary of Oriskany creek and the Mohawk river flows through the village. The population of the village according to the census of 1915, is 1564, an increase of 154 since 1910. The village has a public water supply furnished by impounding a small stream several miles from the village. About 95 per cent of the houses in the village are supplied with public water. Electricity and the usual modern improvements are available. The chief deficiency and drawback to the prosperity of the village appears to be the absence of a sewer system. The village must depend for any further development and growth on its ability to attract population as a residential center. There are no manufacturing or commerical elements to any extent in the village, but the village itself possesses decidedly attractive features as a pleasant residential center if the modern improvements can be guaranteed.

The only streets which have any sanitary sewers whatever are Main street and Putnam avenue. These streets have several private sewers constructed by groups of residents on their respective streets. The effluents from these sewers are discharged at several places along Big creek. Private drains and sewers from houses near the creek were also found discharging openly into Big creek. At some of the points of discharge conditions were bad, but at many no nuisance was created.

Three streets in the village, namely, Union, Sanger and White streets, are provided with storm water drains. As far as could be learned no sewage was being discharged into the storm drains in these streets. The inlet of these drains generally consists of vertical tile pipe with an iron bar grating over the end.

From the records of the sanitary survey made by the village some time ago it was learned that at that time the following conditions existed in regard to the disposal of sewage:

1. That about 186 buildings discharged sewage into Big creek.
2. That about 175 buildings discharged sewage into cesspools.
3. That about 276 privies were in use.

From a general inspection of the village it appeared that most of the privies at present are located in outlying parts of the village, and but few are located in the more central part of the village. Some privies were open and in an insanitary condition. The prevailing type of cesspools is the leaching cesspool, many of which have been made from old abandoned wells.

During the past year this Department has received applications from different residents of Waterville to discharge sewage after a preliminary treatment by septic tanks either into the creek flowing through the village or into the storm sewers. As a result of the most recent request the present investigation was made. Requests for a permit to discharge the effluent from a septic tank into a storm sewer in Union street, Waterville, was made by Miss Mary E. Daniels. The property is located in a part of the village where the soil is clayey with a gravel surface. In the excavation made for the septic tank, the elevation of the ground water appeared to be about 5 feet below the surface of the ground and the soil to be a gravel mixed with clay. South of the proposed location of the septic tank is a field used at present as a garden. It appears from the inspection that it is possible to dispose of the effluent of the septic tank by subsurface irrigation in this field. Using about 50 feet per person of subsurface tiling laid with open joints at a depth of 24 to 30 inches below the surface of the ground and about 5 feet apart and so arranged as to permit of the use of half of the system on alternating weeks, would in all probability care for the sewage from the property. By placing the tile at a depth of 24 to 30 inches it would in no way interfere with the ploughing and

planting of the garden. The proper and logical way to dispose of sewage from properties in the thickly built up districts, however, is by a comprehensive sanitary sewer system.

As a result of the present investigation, I conclude that the present sewerage conditions in the village of Waterville are inadequate and improper. The village is an attractive residential center and the people desire a proper method of disposal of sewage. The question is one that has been long standing and the time has come when the residents should be furnished proper sewerage facilities. Sewage is being unlawfully discharged into Big creek, and many privies in the village are insanitary. About 95 per cent. of the houses are supplied with public water, but a great many of them are without proper toilet facilities.

I, therefore, recommend that the village authorities be advised to employ a competent sanitary engineer to prepare plans for a comprehensive system of sewerage and a sewage disposal plant, these plans to be submitted to this Department for approval, as provided by the Public Health Law. While this law requires that the plans submitted shall cover the whole village and show an adequate system of sewerage, this does not mean that the entire system must be installed at once. In other words only the more necessary portion of the system need be built at present, and application can be made, at the same time that application is made for the approval of the plans, for permission to omit temporarily the construction of such sewers as at present are not needed. Furthermore, the funds for the construction of the more necessary portion of a general sewer system may be provided for by the issuance of long term bonds.

It will be seen that the village can thereby proceed to rectify the insanitary conditions in such a manner that the first cost and the annual cost may be made very moderate, and at the same time may provide, finally, a complete adequate sewer system to take care of all future needs of the village.

I further recommend that copies of this report be sent to the local Board of Health and to Miss Mary E. Daniels, and that the Board be urged to take immediate steps to carry out the recommendations of this report, in accordance with the provisions of the Public Health Law.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 13, 1917

Copies of this report were sent to the local Board of Health and Miss Mary E. Daniels.

In addition to the above, inspections were made or advice given through correspondence in matters relating to sewerage and sewage disposal at the following places: Athens, Binghamton (Mountain Sanatorium), Brookhaven (T.), Camp Whitman, Green Island, Livonia, Mr. Vision (Otsego County Tuberculosis Hospital), Yorktown.

PROTECTION OF PUBLIC WATER SUPPLIES

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ENACTMENT AND ENFOKCEMENT OF RULES AND REGULATIONS FOR THE PROTECTION OF PUBLIC WATER SUPPLIES

One of the important duties of the Engineering Division is the preparation of rules and regulations for the sanitary protection of public water supplies. Upon requests from local officials having supervision of the waterworks, this Department enacts such rules and regulations according to the provisions of the Public Health Law.

For the enforcement of such rules and regulations a definite procedure is prescribed by the Public Health Law and the carrying out of this procedure is a duty which rests largely upon the waterworks officials acting in conjunction with this Department and with the local boards of health.

Of the public water supplies of the state some 85 are now protected by rules and regulations. These rules and regulations are prepared in each case after careful inspection of the water supply and after local conditions and requirements have been fully considered.

During the year 1917, there were before the Department for enactment or amendment, rules and regulations for the protection of the water supplies in the cases of the following municipalities: Corinth, Cornwall, Gilbertsville, Hilton, Ithaca, (Cornell University), Monroe, New York City, Olean, Tarrytown and Wellsville.

Of the above list rules and regulations were enacted for Corinth, Cornwall, Ithaca, (Cornell Universtiy), New York City, Tarrytown, (amendment), and Wellsville. In the cases of the other municipalities, rules and regulations have been fully prepared but this Department is awaiting other advices from the local authorities before final enactment.

Abstract of the New York State Public Health Law providing for the protection from contamination of the public water supplies throughout the State of New York. Chapter 45 of the Consolidated Laws (Public Health Law) as finally amended by chapter 665 of the Laws of 1915.

Section 70. Rules and regulations of department. The state department of health may make rules and regulations for the protection from contamination of any or all public supplies of potable waters and their sources within the state, and the commissioner of water supply, gas and electricity of the city of New York and the board of water supply of the city of New York may make such rules and regulations subject to the approval of the state department of health for the protection from contamination of any or all public supplies of potable waters and their sources within the state where the same constitute a part of the source of the public water supply of said city. If any such rule or regulation relates to a temporary source or act of contamination, any person violating such rule or regulation shall be liable to prosecution for misdemeanor for every such violation, and on conviction shall be punished by a fine not exceeding two hundred dollars, or imprisonment not exceeding one year, or both. If any such rule or regulation relates to a permanent source or act of contamination, said department may impose penalties for the violation thereof or the noncompliance therewith, not exceeding two hundred dollars for every such violation or noncompliance. Every such rule or regulation shall be published at least once in each week for six consecutive weeks, in at least one newspaper of the county where the waters to which it relates are located. The cost of such publication shall be paid by the corporation or municipality benefited by the protection of the water supply to which the rule or regulation published relates. The affidavit of the printer, publisher or proprietor of the newspaper in which such rule or regulation is published may be filed, with the rule or regulation published, in the county clerk's office of such county and such affidavit and rule and regulation shall be conclusive evidence of such publication, and of all the facts therein stated in all courts and places.

Section 71. Inspection of water. The officer or board having by law the management and control of the potable

water supply of any municipality, and in the city of New York, the commissioner of water supply, gas and electricity, and the board of water supply of the city of New York, or the corporation furnishing such supply, may make such inspection of the sources of such water supply as such officer, board or corporation deems advisable and to ascertain whether the rules or regulations of the state department and of the commissioner of water supply, gas and electricity of the city of New York, and of the board of water supply of the city of New York, are complied with, and shall make such regular or special inspections as the state commissioner of health or the commissioner of the department of water supply, gas and electricity of the city of New York, or the board of water supply of the city of New York, may prescribe. If any such inspection discloses a violation of any such rule or regulation relating to a temporary or permanent source or act of contamination, such officer, board or corporation shall cause a copy of the rule or regulation violated to be served upon the person violating the same, with a notice of such violation. If the person served does not immediately comply with the rule or regulation violated, such officer, board or corporation, except in a case concerning the violation of a rule or regulation relating to a temporary or permanent source or act of contamination affecting the potable water supply of the city of New York, shall notify the state department of the violation, which shall immediately examine into such violation; and if such person is found by the state department to have actually violated such rule or regulation, the commissioner of health shall order the local board of health of such municipality wherein the violation or noncompliance occurs, to convene and enforce obedience to such rule or regulation. If the local board fails to enforce such order within ten days after its receipt, the corporation furnishing such water supply or the municipality deriving its water supply from the waters to which such rule or regulation relates, or the state commissioner of health or the local board of health of the municipality wherein the water supply protected by these rules is used, or any person interested in the protection of the purity of the water supply, may maintain an action in a court of record which shall be tried in the county where the cause of action arose against such person, for the recovery of the penalties incurred by such violation, and for an injunction restraining him from the continued violation of such rule or regulation. If the person served does not comply within

five days with the rule or regulation violated, in case such rule or regulation relates to a temporary or permanent source or act of contamination affecting the potable water supply of the city of New York, the commissioner of water supply, gas and electricity of said city, or the board of water supply of the city of New York, may summarily enforce compliance with such rule or regulation, and may summarily abate or remove the cause of the violation of such rule or regulation or the nuisance so created, and to that end may employ such force as may be necessary and proper; provided, however, that no building or improvements shall be removed, disturbed or destroyed by the said commissioner of water supply, or the said board of water supply until he or they shall cause measurements to be made of the buildings and photographs of the exterior views thereof, which measurements and photographs shall be at the disposition thereafter of the owners or their attorneys, and failure to exercise such right of abatement shall not be deemed a waiver thereof. Failure to comply within five days with such rule and regulation shall further entitle the city of New York to maintain an action in any court having jurisdiction thereof for the recovery of the penalties incurred by such violation and for an injunction restraining the person or persons violating such rule or regulation, or creating or continuing such nuisance, from the continued violation of such rule or regulation or continuance of such nuisance; the remedy by abatement being not exclusive.

Section 73. Sewage. When the state department of health, or the commissioner of water supply, gas and electricity of the city of New York, or the board of water supply of the city of New York, shall, for the protection of a water supply from contamination, make orders or regulations the execution of which will require or make necessary the construction and maintenance of any system of sewage, or a change thereof, in or for any village or hamlet, whether incorporated or unincorporated, or the execution of which will require the providing of some public means of removal or purification of sewage, the municipality or corporation owning the water works benefited thereby shall, at its own expense, construct and maintain such system of sewage, or change thereof, and provide and maintain such means of removal and purification of sewage and such works or means of sewage disposal as shall be approved by the state department of health and for that purpose said municipality or corporation may acquire, under the general condemnation

law, the necessary real estate or interest therein whether now used for public or private purposes. When the execution of any such regulations of the state department of health, or the commissioner of water supply, gas and electricity of the city of New York, or the board of water supply of the city of New York, will occasion or require the removal of any building or buildings, the municipality or corporation owning the water works benefited thereby shall, at its own expense, remove such building and pay to the owner thereof all damages occasioned by such removal. When the execution of any such regulation will injuriously affect any property the municipality or corporation owning the water works benefited thereby shall make just and adequate compensation for the property so taken or injured and for all injuries caused to the legitimate use or operation of such property. Until such construction or change of such system or systems of sewerage, and the providing of such means of removal or purification of sewage, and until such works or means of sewage disposal and the removal of any building are so made by the municipality or corporation owning the water works to be benefited thereby at its own expense, and until, except in the case of a municipality, the corporation owning the water works benefited shall make just and adequate payment for all injuries to property and for all injuries caused to the legitimate use or operation of such property, there shall be no action or proceeding taken by any such municipality, officer, board, person or corporation against any person or corporation for the violation of any regulation of the state department of health under this article, and no person or corporation shall be considered to have violated or refused to obey any such rule or regulation. The owner of any building the removal of which is occasioned or required, or which has been removed by any rule or regulation of the state department of health, or the commissioner of water supply, gas and electricity of the city of New York, or the board of water supply of the city of New York, made under the provisions of this article and all persons whose rights of property are injuriously affected by the enforcement of any such rule or regulation, shall have a cause of action against the municipality or corporation owning the water works benefited by the enforcement of such rule or regulation, for all damages occasioned or sustained by such removal or enforcement, including all injuries caused to the legitimate use or operation of such property, and an action therefor may be brought against

such municipality or corporation in any court of record in the county in which the premises or property affected is situated and shall be tried therein; or such damage may be determined by a special proceeding in the supreme court or the county court of the county in which the property is situated. Such special proceedings shall be commenced by petition and notice to be served by such owner upon the municipality or corporation in the same manner as for the commencement of condemnation proceedings. Such municipality or corporation may make and serve an answer to such petition as in condemnation proceedings. The petition and answer shall set forth the claims of the respective parties, and the provisions of the condemnation law shall be applicable to the subsequent proceedings upon the petition and answer, if any. Either party may, before the service of the petition or answer respectively, offer to take or pay a certain sum, and no costs shall be awarded against either party unless the judgment is more unfavorable to him than his offer. Provided, however, that in case of a summary abatement by a municipality as hereinbefore provided, no costs shall be awarded against the owner of the property damaged and the commissioners of appraisal in their report shall recommend such additional sum as may in their judgment be reasonable as compensation for witnesses and other necessary expenses of claimant. Such municipality shall, within three calendar months after the confirmation of the report of the commissioners of appraisal, pay to the respective owners and bodies politic or corporate, mentioned or referred to in said report, in whose favor any sum or sums of money shall be estimated and reported by said commissioners, the respective sum or sums so estimated and reported in their favor respectively, with lawful interest thereon. And in case of neglect or default in the payment of the same within the time aforesaid, the respective person or persons or bodies politic or corporate in whose favor the same shall be so reported, his, her, or their executors, administrators or successors, at any time or times, after application first made by him, her, or them to such municipality for payment thereof, may sue for and recover the same, with lawful interest as aforesaid, and the costs of suit in any proper form of action against such municipality in any court having cognizance thereof, and it shall be sufficient to declare generally for so much money due to the plaintiff or plaintiffs therein by virtue of this act, and the

report of said commissioners, with proof of the right and title of the plaintiff or plaintiffs to the sum or sums demanded shall be conclusive evidence in such suit or action.

Concerning the obligation of water corporations or departments to provide for cost of, or for the making of changes or improvements demanded by the rules, but not specifically mentioned in section 73 of the above law, the State Attorney-General has rendered an opinion from which the following is abstracted:

"In my opinion the proper and only lawful construction which can be placed on section 72* of the Public Health Law is that all damages and injury to the owner of any property affected by changes required to be made to comply with the rules of the Department of Health must be ascertained and paid prior to the taking possession of the property and is a prerequisite to the enforcement of said rules in all cases except such as are a nuisance in and of themselves, in which cases the Department of Health would have power and authority outside of sections 70, 71, and 72* to abate the same. Any other construction would, to my mind, render the law unconstitutional. In brief, I am of the opinion that the State Department of Health * * * can make and promulgate rules relating and controlling the use of premises surrounding the sources in all regards, and that a person violating any of these rules can be punished as provided by the penalties, but before such punishment can be inflicted, the corporation for whose benefit the rules are made and established must pay or tender to the owner of the property affected by the enforcement of such rules an amount equal to all damages for making the changes necessary."

CORINTH

Rules and regulations for the protection from contamination of the public water supply of the village of Corinth, Saratoga county.

Enacted by the New York State Commissioner of Health under chapter 49 of the Laws of 1909, constituting chapter 45 of the Consolidated Laws, as finally amended by chapter 665 of the Laws of 1915, (Public Health Law).

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*This section (72) of the Old Public Health Law is now section 73 of chapter 45 of the Consolidated Laws (Public Health Law).

Rules and regulations

The rules and regulations hereinafter given, duly made and enacted in accordance with the provisions of sections 70, 71, 72 and 73 of chapter 45 of the Consolidated Laws (Public Health Law) as heretofore set forth shall apply to all natural and artificial reservoirs on the Kendall and Sturdevant creeks and all watercourses tributary thereto or ultimately discharging into said reservoirs, these bodies of water being sources of the public water supply of the village of Corinth, Saratoga county, New York. The term "reservoir" wherever used in these rules is intended to mean and refer to all storage and impounding reservoirs on the Kendall and Sturdevant creeks which are tributary to or which serve as sources of this public water supply or to any additional reservoir which may be constructed or used for the purpose of this public water supply. The term "watercourse" wherever used in these rules is intended to mean and include every spring, pond (other than the artificial reservoirs and filter basins), stream, ditch, gutter, or other channel of any kind the waters of which when running whether continuously or occasionally eventually flow or may flow into the public water supply of the village of Corinth.

Wherever a linear distance of a structure or object from a reservoir or from a watercourse is mentioned in these rules, it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the high-water mark of a reservoir or to the edge, margin or precipitous bank forming the ordinary high-water mark of such watercourse.

Privies Adjacent to Any Reservoir or Watercourse

1. No privy, privy vault, pit, cesspool or any other receptacle of any kind used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, maintained, or allowed to remain within one hundred (100) feet of any reservoir or watercourse tributary to the public water supply of the village of Corinth.

2. No privy, privy vault, pit, cesspool or any other receptacle used for the permanent deposit of human excreta, shall be constructed, located, placed, maintained or allowed to remain within three hundred (300) feet of any reservoir or watercourse tributary to the public water supply of the village of Corinth.

3. No cesspool, pit or other receptacle of any kind used for the temporary storage of human excreta or sewage shall be constructed, located, maintained or allowed to remain between the limiting distances prescribed by Rule 1 and the limiting distances prescribed by Rule 2, unless said cesspool, pit or other receptacle is so arranged and equipped that the said excreta or sewage are at once removed by pump or other satisfactory means through water-tight pipes or conduits to some proper place of ultimate disposal, as hereinafter provided, or unless suitable vessels or receptacles for the temporary storage of said human excreta or sewage are provided and at all times maintained in an absolutely water-tight condition and in such manner as to permit of convenient removal of said excreta or sewage to some place of ultimate disposal as hereinafter set forth.

4. The excreta collected in the aforesaid temporary receptacles permitted under Rule 3 shall be removed and the receptacles thoroughly cleaned and deodorized as often as may be found necessary to maintain the privy in proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundation or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of disposal hereinafter specified, and that the contents, while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to occupants of the premises and the adjacent premises.

5. Unless otherwise specially ordered or permitted by the State Department of Health, the excreta collected in the aforesaid temporary receptacles

permitted under Rule 3 shall, when removed, be disposed of by burying in trenches or pits at a depth of not less than 18 inches below the surface and at a distance not less than five hundred (500) feet from any reservoir or watercourse tributary to the public water supply of the village of Corinth.

6. Whenever, owing to the character of the soil or of the surface of the ground, or owing to the height or flow of subsoil or surface water, or other special local conditions, it is considered by the State Commissioner of Health that excremental matter from any privy or aforesaid receptacles, or from any trench or place of disposal or the garbage or wastes from any dump, may be washed over the surface or through the soil in an imperfectly purified condition into any reservoir or watercourse, then the said privy or receptacle for excreta or the trench or place of disposal or the said garbage or waste dump, shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Wastes, Etc.

7. No house slops, bath water, sewage or other excretal matter from any water closet, privy, cesspool or other source shall be thrown, placed, led, conducted, discharged or allowed to escape or flow in any manner either directly or indirectly into any reservoir or any watercourse tributary to the public water supply of the village of Corinth, nor shall any such matters be thrown, placed, led, discharged or allowed to escape beneath the surface except into water-tight receptacles, the contents of which are to be removed as provided by Rule 4, within three hundred (300) feet of any reservoir or watercourse tributary to the public water supply of the village of Corinth.

8. No garbage, putrescible matter, kitchen or sink wastes, refuse or waste water, from any creamery, cheese factory, laundry, nor water in which milk cans, utensils, clothing, bedding, carpets or harness have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into any reservoir or watercourse, nor shall any such liquid or solid refuse or waste be thrown, discharged or allowed to escape or remain upon the surface of the ground or to percolate into or through the ground below the surface in any manner whereby the same may flow into any reservoir or watercourse within a distance of two hundred (200) feet from any reservoir or watercourse tributary to the public water supply of the village of Corinth.

9. No clothing, bedding, carpets, harnesses, vehicle, receptacles, utensils, nor anything that pollutes water, shall be washed, rinsed or placed in any reservoir or watercourse.

Bathing, Animals, Manure, Compost, Etc.

10. No person shall be allowed to bathe in any reservoir or watercourse, nor shall any animals or poultry be allowed to stand, wallow, wade or swim in any reservoir or watercourse, nor be washed therein. The watering of animals or poultry in any reservoir of the public water supply of the village of Corinth is prohibited, nor shall any such watering be allowed in any watercourse tributary to this water supply within one thousand (1,000) feet of said reservoir. No watering place shall be maintained in such a way as to pollute with muddy leachings or excretal matters any streams tributary to the public water supply of the village of Corinth.

11. No stable for cattle or horses, barnyard, hogyard, pig-pen, poultry house or yard, hitching place or standing place for horses or other animals, manure pile or compost heap, shall be constructed, placed, maintained or allowed to remain with its nearest point less than two hundred (200) feet from any reservoir or watercourse tributary to the public water supply of the village of Corinth, and none of the above-named objects or sources of pollution shall be so constructed, placed, maintained or allowed to remain where or in such a manner that the drainings, leachings or washings from the same may enter any such reservoir or watercourse without first having

passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainings, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage for a distance of not less than two hundred (200) feet from any reservoir or watercourse tributary to the public water supply of the village of Corinth.

12. No human excreta and no compost or other matter containing human excreta shall be thrown, placed or allowed to escape into any reservoir or watercourse, nor to be placed, piled or spread upon the surface of the ground at any point on the watershed tributary to the public water supply of the village of Corinth, nor shall such human excreta or compost or other matter containing human excreta be dug or buried in the soil at a less depth than 18 inches below the surface nor within a distance of five hundred (500) feet from any reservoir or watercourse tributary to the public water supply of the village of Corinth and no manure or compost of any kind shall be placed, piled or spread upon the ground within a distance of one hundred (100) feet from any reservoir or watercourse tributary to the public water supply of the village of Corinth.

13. No decayed or fermented fruit or vegetables, cider-mill wastes, roots, grain or other vegetable refuse of any kind shall be thrown, placed, discharged or allowed to escape or pass into any reservoir or watercourse, nor shall they be thrown, placed, piled, maintained or allowed to remain in such places that the drainage, leachings, or washings therefrom may flow by open, blind or covered drains or channels of any kind into any reservoir or watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that sufficient purification has been secured unless the above-mentioned drainings, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred and fifty (150) feet before entering any reservoir or watercourse tributary to the public water supply of the village of Corinth.

Dead Animals, Offal, Manufacturing Wastes, Etc.

14. No dead animals, bird, fish or any part thereof nor any offal or waste matter of any kind, shall be thrown, placed, discharged or allowed to escape or to pass into any reservoir or watercourse. Nor shall any such material or refuse be so located, placed, maintained or allowed to remain that the drainage, leachings or washings therefrom may reach any such reservoir or watercourse without having first percolated over or through the soil in a scattered, dissipated form and not concentrated in perceptible lines of drainage, for a distance of two hundred and fifty (250) feet from any reservoir or watercourse tributary to the public water supply of the village of Corinth.

Fishing, Boating and Ice Cutting

15. No boating of any kind, or fishing from boats, or through the ice, or any trespassing whatever shall be allowed in or upon the waters or ice of the reservoirs.

Labor Camps

16. No temporary camp, tent, building or other structures for housing laborers engaged on construction work or for other purposes shall be located, placed, or maintained within a distance of five hundred (500) feet from any reservoir or watercourse tributary to the public water supply of the village of Corinth.

Cemeteries

17. No interment of a human body shall be made within a distance of three hundred (300) feet from any reservoir or from any watercourse tributary to the public water supply of the village of Corinth.

Inspections

18. The board of trustees of the village of Corinth shall make regular and thorough inspections of the reservoirs, streams and drainage areas tributary thereto for the purpose of ascertaining whether the above rules and regulations are being complied with, and it shall be the duty of said board of trustees to cause copies of any rules and regulations violated to be served upon the persons violating the same with notices of such violations; and if such persons served do not immediately comply with the rules and regulations it shall be the further duty of the board of trustees to promptly notify the State Commissioner of Health of such violations. The board of trustees shall report in writing annually on the first of January, the results of the regular inspection made during the preceding year stating the number of inspections which have been made, the number of violations found, the number of notices served and the general condition of the watershed at the time of the last inspection.

Penalty

19. In accordance with section 70 of chapter 45 of the Consolidated Laws (Public Health Law), the penalty for each and every violation of or noncompliance with, any of these rules and regulations which relate to a permanent source or act of contamination, is hereby fixed at two hundred ($200) dollars.

The foregoing rules and regulations for the protection from contamination of the public water supply of the village of Corinth are hereby duly made, ordained and established on this 24th day of January, 1917, pursuant to chapter 45 of the Consolidated Laws (Public Health Law) of the State of New York, as finally amended by chapter 665 of the Laws of 1915.

LINSLY R. WILLIAMS,
Acting State Commissioner of Health

ALBANY, N. Y.

These rules and regulations to be operative and valid must first be published at least once each week for six consecutive weeks in at least one newspaper in Saratoga county and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the village of Corinth.

CORNWALL

Rules and regulations for the protection from contamination of the public water supply of the village of Cornwall, Orange county.

Enacted by the New York State Commissioner of Health under chapter 49 of the Laws of 1909, constituting chapter 45 of the Consolidated Laws, as finally amended by chapter 665 of the Laws of 1915, (Public Health Law).

Rules and regulations

The rules and regulations hereinafter given, duly made and enacted in accordance with the provisions of sections 70, 71, 72 and 73 of chapter 45 of the Consolidatel Laws (Public Health Law) as heretofore set forth shall

apply to all natural and artificial reservoirs on Black Rock Brook and to all watercourses tributary thereto or ultimately discharging into said reservoirs, these bodies of water being sources of the public water supply of the village of Cornwall, Orange county, N. Y. The term "reservoir," wherever used in these rules is intended to mean and refer to all storage and impounding reservoirs on the Black Rock Brook which are tributary to or which serve as sources of this public water supply or to any additional reservoir which may be constructed or used for the purpose of this public water supply. The term "watercourse" wherever used in these rules is intended to mean and include every spring, pond (other than the artificial reservoirs and filter basins) stream, ditch, gutter, or other channel of every kind the waters of which when running whether continuously or occasionally eventually flow or may flow into the public water supply of the village of Cornwall.

Wherever a linear distance of a structure or object from a reservoir or from a watercourse is mentioned in these rules it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the highwater mark of a reservoir or to the edge, margin or precipitous bank forming the ordinary highwater mark of such watercourse.

Privies Adjacent to Any Reservoir or Watercourse

1. No privy, privy vault, pit, cesspool or any other receptacle of any kind used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, maintained or allowed to remain within one hundred (100) feet of any reservoir or watercourse tributary to the public water supply of the village of Cornwall.

2. No privy, privy vault, pit, cesspool or any other receptacle used for the permanent deposit of human excreta shall be constructed, located, placed, maintained or allowed to remain within three hundred (300) feet of any reservoir or watercourse tributary to the public water supply of the village of Cornwall.

3. No cesspool, pit or other receptacle of any kind used for the temporary storage of human excreta or sewage shall be constructed, located, maintained or allowed to remain between the limiting distances prescribed by Rule 1 and the limiting distances prescribed by Rule 2 unless said cesspool, pit or other receptacle is so arranged and equipped that the said excreta or sewage are at once removed by pump or other satisfactory means through watertight pipes or conduits to some proper place of ultimate disposal, as hereinafter provided, or unless suitable removable vessels or receptacles for the temporary storage of said human excreta or sewage are provided and at all times maintained in an absolutely watertight condition and in such manner as to permit of convenient removal of said excreta or sewage to some place of ultimate disposal as hereinafter set forth.

4. The excreta collected in the aforesaid removable receptacles permitted under Rule 3 shall be removed and the receptacles thoroughly cleaned and deodorized as often as may be found necessary to maintain the privy in proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundation or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of disposal hereinafter specified, and that the contents while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to occupants of the premises and the adjacent premises.

5. Unless otherwise specially ordered or permitted by the State Department of Health, the excreta collected in the aforesaid removable receptacles permitted under Rule 3 shall, when removed be disposed of by burying in trenches or pits at a depth of not less than 18 inches below the surface and at some suitable point off the watershed tributary to the public water supply of the village of Cornwall.

6. Whenever, owing to the character of the soil or of the surface of the ground, or owing to the height or flow of subsoil or surface water, or other

special local conditions it is considered by the State Commissioner of Health that excremental matter from any privy or aforesaid receptacle, or from any trench or place of disposal, or the garbage or wastes from any dump, may be washed over the surface or through the soil in an imperfectly purified condition into any reservoir or watercourse, then the said privy or receptacle for excreta, or the trench or place of disposal, or the said garbage or waste dump, shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Waste, Etc.

7. No house slops, bath water, sewage or other excretal matter from any water closet, privy, cesspool or other source shall be thrown, placed, led, conducted, discharged or allowed to escape or flow in any manner either directly or indirectly into any reservoir or any watercourse tributary to the public water supply of the village of Cornwall, nor shall any such matters be thrown, placed, led, discharged or allowed to escape beneath the surface except into watertight receptacles, the contents of which are to be removed as provided by Rule 4, within three hundred (300) feet of any reservoir or watercourse tributary to the public water supply of the village of Cornwall.

8. No garbage, putrescible matter, kitchen or sink wastes, refuse or waste matter from any creamery, cheese factory or laundry, nor water in which milk cans, utensils, clothing, bedding, carpets, or harness have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown, or discharged directly or indirectly into any reservoir or watercourse, nor shall any such liquid or solid refuse or waste be thrown, discharged or allowed to escape or remain upon the surface of the ground or to percolate into or through the ground below the surface in any manner whereby the same may flow into any reservoir or watercourse within a distance of two hundred (200) feet from any reservoir or watercourse tributary to the public water supply of the village of Cornwall.

9. No clothing, bedding, carpets, harnesses, vehicle, receptables, utensils, nor anything that pollutes water, shall be washed, rinsed, or placed in any reservoir or watercourse.

Bathing, Animals, Manure, Compost, Etc.

10. No person shall be allowed to bathe in any reservoir or watercourse, nor shall any animals or poultry be allowed to stand, wallow, wade or swim in any reservoir or watercourse, nor be washed therein. The watering of animals or poultry in any reservoir of the public water supply of the village of Cornwall is prohibited; nor shall any such watering be allowed in any watercourse tributary to this water supply. No watering place shall be maintained in such a way as to pollute with muddy leachings or excretal matters any streams tributary to the public water supply of the village of Cornwall.

11. No stable for cattle or horses, barnyard, hogyard, pig-pen, poultry house or yard, hitching place or standing place for horses or other animals, manure pile or compost heap, shall be constructed, placed, maintained or allowed to remain with its nearest point less than three hundred (300) feet from any reservoir or watercourse tributary to the public water supply of the village of Cornwall, and none of the above named objects or sources of pollution shall be so constructed, placed, maintained or allowed to remain where or in such a manner that the drainings, leachings or washings from the same may enter any such reservoir or watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainings, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of draindage for a distance of not less than three hundred (300) feet from any reservoir or watercourse tributary to the public water supply of the village of Cornwall.

12. No human excreta and no compost or other matter containing human excreta shall be thrown, placed or allowed to escape into any reservoir or watercourse, nor to be placed, piled or spread upon the surface of the ground at any point on the watershed tributary to the public water supply of the village of Cornwall nor shall such human excreta or compost or other matter containing human excreta be dug or buried in the soil at a less depth than 18 inches below the surface nor within a distance of five hundred (500) feet from any reservoir or watercourse tributary to the public water supply of the village of Cornwall and no manure or compost of any kind shall be placed, piled or spread upon the ground within a distance of two hundred (200) feet from any reservoir or watercourse tributary to the public water supply of the village of Cornwall.

13. No decayed or fermented fruit or vegetables, cider mill wastes, roots, grain or other vegetable refuse of any kind shall be thrown, placed, discharged or allowed to escape or pass into any reservoir or watercourse, nor shall they be thrown, placed, piled, maintained or allowed to remain in such place that the drainage, leachings or washings therefrom may flow by open, blind or covered drains or channels of any kind into any reservoir or watercourse without first having passed over or through such an extent of soil as to have been properly purified and in no case shall it be deemed that sufficient purification has been secured unless the above mentioned drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage for a distance of not less than one hundred and fifty (150) feet before entering any reservoir or watercourse tributary to the public water supply of the village of Cornwall.

Dead Animals, Offal, Manufacturing Wastes, Etc.

14. No dead animals, bird, fish or any part thereof nor any offal or waste matter of any kind, shall be thrown, placed, discharged or allowed to escape or to pass into any reservoir or watercourse. Nor shall any such material or refuse be so located, placed, maintained or allowed to remain that the drainage, leachings or washings therefrom may reach any such reservoir or watercourse without having first percolated over or through the soil in a scattered, dissipated form and not concentrated in perceptible lines of drainage, for a distance of three hundred (300) feet from any reservoir or watercourse tributary to the public water supply of the village of Cornwall.

Fishing, Boating and Ice Cutting

15. No boating of any kind, or fishing from boats, or through the ice and no ice cutting or any trespassing whatever, shall be allowed in or upon the waters or ice of the reservoirs.

Labor Camps

16. No temporary camp, tent, building or other structures for housing laborers engaged on construction work or for other purposes shall be located, placed or maintained within a distance of five hundred (500) feet from any reservoir or watercourse tributary to the public water supply of the village of Cornwall.

Cemeteries

17. No interment of a human body shall be made within a distance of five hundred (500) feet from any reservoir or from any watercourse tributary to the public water supply of the village of Cornwall.

Inspections

18. The Board of Trustees of the village of Cornwall shall make regular and thorough inspections of the reservoirs, streams and drainage area tributary thereto for the purpose of ascertaining whether the above rules and regulations are being complied with, and it shall be the duty of said Board of Trustees to cause copies of any rules and regulations violated to be served

upon the persons violating the same with notices of such violations; and if such persons served do not immediately comply with the rules and regulations it shall be the further duty of the Board of Trustees to promptly notify the State Commissioner of Health of such violations. The Board of Trustees shall report in writing annually on the first day of January the results of the regular inspections made during the preceding year stating the number of inspections which have been made, the number of violations found, the number of notices served, and the general condition of the watershed at the time of the last inspection.

Penalty

19. In accordance with section 70 of Chapter 45 of the Consolidated Laws (Public Health Law), the penalty for each and every violation of or noncompliance with, any of these rules and regulations which relate to a permanent source or act of contamination, is hereby fixed at one hundred ($100) dollars.

The foregoing rules and regulations for the protection from contamination of the public water supply of the village of Cornwall are hereby duly made, ordained, and established on this 4th day of April, 1917, pursuant to Chapter 45 of the Consolidated Laws (Public Health Law), of the State of New York, as finally amended, by chapter 665 of the Laws of 1915.

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Albany, N. Y. *State Commissioner of Health*

These rules and regulations to be operative and valid must first be published at least once each week for six consecutive weeks in at least one newspaper in Orange County and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the village of Cornwall.

ITHACA (Cornell University)

Rules and regulations for the protection from contamination of the public water supply of Cornell University, Ithaca, Tompkins county.

Enacted by the New York State Commissioner of Health under chapter 49 of the Laws of 1909, constituting chapter 45 of the Consolidated Laws, as finally amended by chapter 665 of the Laws of 1915, (Public Health Law).

Rules and regulations

The rules and regulations hereinafter given, duly made and enacted in accordance with the provisions of sections 70, 71, 72 and 73 of chapter 45 of the Consolidated Laws (Public Health Law), as heretofore set forth shall apply to all natural and artificial reservoirs on the Fall creek, and to all watercourses tributary thereto or ultimately discharging into said reservoirs, these bodies of water being sources of the public water supply of Cornell University, at Ithaca, Tompkins county, New York. The term "reservoir" wherever used in these rules is intended to mean and refer to all storage and impounding reservoirs on the Fall creek, which are tributary to or which serve as sources of this public water supply or to any additional reservoir which may be constructed or used for the purposes of this public water supply. The term

"watercourse" wherever used in these rules is intended to mean and include every spring, pond (other than the artificial reservoirs and filter basins), stream, ditch, gutter, or other channel of every kind, the waters of which when running, whether continuously or occasionally eventually flow or may flow into the public water supply of Cornell University.

Wherever a linear distance of a structure or object from a reservoir or from a watercourse is mentioned in these rules, it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the high water mark of a reservoir or to the edge, margin or precipitous bank forming the ordinary high water mark of such watercourse.

Privies Adjacent to Any Reservoir or Watercourse

1. No privy, privy vault, pit, cesspool or any other receptable of any kind used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, maintained or allowed to remain within fifty (50) feet of any reservoir or within fifteen (15) feet of any watercourse tributary to the public water supply of Cornell University.

2. No privy, privy vault, pit, cesspool or any other receptacle used for the permanent deposit of human excreta shall be constructed, located, placed, maintained or allowed to remain within three hundred (300) feet of any reservoir or within one hundred and thirty (130) feet of any watercourse tributary to the public water supply of Cornell University.

3. No cesspool, pit or other receptacle of any kind used for the temporary storage of human excreta or sewage shall be constructed, located, maintained or allowed to remain between the limiting distances prescribed by Rule 1 and the limiting distances prescribed by Rule 2 unless said cesspool, pit or other receptacle is so arranged and equipped that the said excreta or sewage is at once removed by pump or other satisfactory means through watertight pipe or conduits to some proper place of ultimate disposal, as hereinafter provided, or unless suitable removable vessels or receptacles or watertight concrete vaults for the temporary storage of said human excreta or sewage are provided, the said vessels, receptacles or vaults being constructed and arranged in accordance with plans approved by and under the supervision of the authorities of Cornell University. The aforesaid removable vessels or receptacles or concrete vaults shall be at all times maintained in an absolutely watertight condition and shall be so arranged as to permit of convenient removal of the excreta deposited therein to some place of ultimate disposal as hereinafter set forth.

4. The excreta collected in the aforesaid removable receptacles and watertight concrete vaults permitted under Rule 3 shall be removed and the receptacles and vaults thoroughly cleaned and deodorized as often as may be found necessary to maintain the privy in proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundation or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of disposal hereinafter specified, and that the contents while being transferred from the privy to the place of disposal shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to occupants of the premises and the adjacent premises.

5. Unless otherwise specially ordered or permitted by the State Department of Health, the excreta collected in the aforesaid removable receptacles or concrete vaults permitted under Rule 3 shall, when removed, be disposed of by burying in trenches or pits at a depth of not less than 18 inches below the surface and at a distance of not less than five hundred (500) feet from any reservoir and not less than three hundred (300) feet from any watercourse tributary to the public water supply of Cornell University.

6. Whenever, owing to the character of the soil or of the surface of the ground or owing to the height or flow of subsoil or surface water or other special local conditions, it is considered by the State Commissioner of Health

that excremental matter from any privy or aforesaid receptacle, or from any trench or place of disposal or the garbage or wastes from any dump, may be washed over the surface or through the soil in an imperfectly purified condition into any reservoir or watercourse, then the said privy or receptacle for excreta or the treuch or place of disposal or the said garbage or waste dump shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Waste, Etc.

7. No house slops, bath water, sewage or other excretal matter from any water-closet, privy, cesspool or other source shall be thrown, placed, led, conducted, discharged or allowed to escape or flow in any manner either directly or indirectly into any reservoir or any watercourse tributary to the public water supply of Cornell University, nor shall any such matters be thrown, placed, led, discharged or allowed to escape beneath the surface except into watertight receptacles, the contents of which are to be removed as provided by Rule 4, within three hundred (300) feet of any reservoir or within fifty (50) feet of any watercourse tributary to the public water supply of Cornell University.

8. No garbage, putrescible matter, kitchen or sink wastes, refuse or waste water from any creamery, cheese factory, laundry nor water in which milk cans, utensils, clothing, bedding, carpets or harness have been washed or rinsed nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into any reservoir or watercourse, nor shall any such liquid or solid refuse or waste be thrown, discharged or allowed to escape or remain upon the surface or to percolate into or through the ground below the surface in any manner whereby the same may flow into any reservoir or watercourse within a distance of fifty (50) feet from any reservoir or watercourse tributary to the public water supply of Cornell University.

9. No clothing, bedding, carpets, harnesses, vehicle, receptacles, utensils nor anything that pollutes water shall be washed, rinsed or placed in any reservoir or watercourse.

Bathing, Animals, Manure, Compost, Etc.

10. No person shall be allowed to bathe in any reservoir or watercourse nor shall any animal or poultry be allowed to stand, wallow, wade or swim in any reservoir or watercourse nor be washed therein.

11. No stable for cattle or horses, barnyard, hogyard, pigpen, poultry house or yard, hitching place or standing place for horses or other animals, manure pile or compost heap shall be constructed, placed, maintained or allowed to remain with its nearest point less than fifty (50) feet from any reservoir or watercourse tributary to the public water supply of Cornell University and none of the above-named objects or sources of pollution shall be so constructed, placed, maintained or allowed to remain where or in such a manner that the drainage, leachings or washings from the same may enter any reservoir or watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainings, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage for a distance of not less than fifty (50) feet from any reservoir or watercourse tributary to the public water supply of Cornell University.

12. No human excreta and no compost or other matter containing human excreta shall be thrown, placed or allowed to escape into any reservoir or watercourse, nor to be placed, piled or spread upon the surface of the ground at any point on the watershed tributary to the public water supply of Cornell University nor shall such human excreta or compost or other matter containing human excreta be dug or buried in the soil at a less depth than 18 inches

below the surface nor within a distance of three hundred (300) feet from any reservoir or watercourse tributary to the public water supply of Cornell University, and no manure or compost of any kind shall be placed, piled or spread upon the ground within a distance of fifty (50) feet from any reservoir or watercourse tributary to the public water supply of Cornell University.

13. No decayed or fermented fruit or vegetables, cider mill wastes, roots, grain or other vegetable refuse of any kind shall be thrown, placed, discharged or allowed to escape or pass into any reservoir or watercourse, nor shall they be thrown, placed, piled, maintained or allowed to remain in such places that the drainage, leachings or washings therefrom may flow by open, blind or covered drains or channels of any kind into any reservoir or watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that sufficient purification has been secured unless the above-mentioned drainings, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than fifty (50) feet before entering any reservoir or watercourse tributary to the public water supply of Cornell University.

Dead Animals, Offal, Manufacturing Wastes, Etc.

14. No dead animals, bird, fish or any part thereof nor any offal or waste matter of any kind shall be thrown, placed, discharged or allowed to escape or to pass into any reservoir or watercourse. Nor shall any such material or refuse be so located, placed, maintained or allowed to remain that the drainage, leachings or washings therefrom may reach any such reservoir or watercourse without having first percolated over or through the soil in a scattered, dissipated form and not concentrated in perceptible lines of drainage for a distance of one hundred (100) feet from any reservoir or watercourse tributary to the public water supply of Cornell University.

15. No temporary camp, tent, building or other structure for housing laborers engaged on construction work or for other purposes shall be located, placed or maintained within a distance of three hundred (300) feet from any reservoir or watercourse tributary to the public water supply of Cornell University.

16. No interment of a human body shall be made within a distance of two hundred (200) feet from any reservoir or from any watercourse tributary to the public water supply of Cornell University.

17. The board of trustees of Cornell University shall make regular and thorough inspections of the reservoirs, streams and drainage areas tributary thereto for the purpose of ascertaining whether the above rules and regulations are being complied with, and it shall be the duty of said board of trustees to cause copies of any rules and regulations violated to be served upon the persons violating the same with notices of such violations; and if such persons served do not immediately comply with the rules and regulations it shall be the further duty of the board of trustees to promptly notify the State Commissioner of Health of such violations. The board of trustees shall report in writing annually on the first day of January the results of the regular inspections made during the preceding year, stating the number of inspections which have been made, the number of violations found, the number of notices served and the general condition of the watershed at time of the last inspection.

Penalty

18. In accordance with section 70 of chapter 70, Consolidated Laws (Public Health Law), the penalty for each and every violation of or noncompliance with any of these rules and regulations which relate to a permanent source or act of contamination is hereby fixed at one hundred ($100) dollars.

The foregoing rules and regulations for the protection from contamination

of the public water supply of Cornell University, Ithaca, N. Y., are hereby duly made, ordained and established on this 10th day of January, 1917, pursuant to chapter 45 of the Consolidated Laws (Public Health Law) of the State of New York, as finally amended by chapter 665 of the Laws of 1915.

LINSLY R. WILLIAMS,
Acting State Commissioner of Health

ALBANY, N. Y.

These rules and regulations to be operative and valid must first be published at least once each week for six consecutive weeks in at least one newspaper in Tompkins, Cayuga and Cortland counties and the affidavit of the printer, publisher or proprietor of each newspaper in which said publication is made, that publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of those counties.

The cost of each such publication, affidavit and filing must be paid by Cornell University.

RULES AND REGULATIONS OF THE DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY OF THE CITY OF NEW YORK IN RELATION TO THE PROTECTION OF THE WATER SUPPLY FROM CONTAMINATION.

DEFINITIONS

1. The watersheds herein referred to are those from which the city of New York, or any private water company serving any portion of said city, obtains any part of its water supply.

2. All springs, marshes, watercourses and reservoirs herein referred to are such as are located on a watershed described in section 1 hereof.

3. The term "watercourse" includes any natural or artificial stream or channel of any kind in or through which water flows continually, intermittently or occasionally.

4. The term "reservoir" includes any natural or artificial lake or pond.

5. The term "department" means the Department of Water Supply, Gas and Electricity of the City of New York, acting by its commissioner or such other official or officials as he shall from time to time in writing designate to execute or supervise the execution of these rules.

Distances

6. When any limiting distance is mentioned it shall refer to the distance by horizontal measurement from the high water mark of a spring, marsh, watercourse or reservoir, except that where there is a precipitous bank, such limiting distance shall refer to the distance by horizontal measurement from the top of such bank.

7. With the approval of the State Commissioner of Health, any limiting distance may be decreased where in the opinion of the department this can be done without danger to water supply, or where the limits or size of the property concerned render this necessary; and with like approval any limiting distance may be increased where in the opinion of the Department this is necessary for the protection of the water supply against contamination.

Deposit, Storage and Disposal of Human Excreta

8. No human excreta shall be deposited in any spring, marsh, watercourse or reservoir.

9. No human excreta shall be deposited on the ground within one hundred and thirty (130) feet of any spring, marsh, watercourse or reservoir, nor

anywhere in such manner that they can be washed into the same by rain, melting snow or otherwise.

10. No privy or other place for the deposit or storage of human excreta, except water-flushed toilets connected by suitable watertight pipes to a sewage disposal system that has been approved by the Department, shall be constructed, located or maintained within fifty (50) feet of any spring, marsh, watercourse or reservoir, or at such place or in such manner as to contaminate or threaten to contaminate the same.

11. Beyond said distance of fifty (50) feet, and for a further distance of eighty (80) feet from a spring, marsh, watercourse or reservoir, no human excreta shall be deposited or stored except (a) in water-flushed toilets of the character above described or (b) in privies with a watertight and flyproof vault, cesspool or other receptacle.

12. In empting a vault, cesspool or other receptacle, or transferring its contents to a transportable receptacle, all necessary care shall be exercised to prevent the contamination of any spring, marsh, watercourse or reservoir. All such transportable receptacles shall be provided with tightly fitting covers, securely fastened during the process of removal to the place of ultimate disposal. They shall be thoroughly cleansed and deodorized as often as may be found necessary by the Department.

13. All places of ultimate disposal of human excreta, other than sewage disposal plants, shall be located not less than two hundred and fifty (250) feet from any spring, marsh, watercourse or reservoir. In the absence of any other method of disposal approved by the Department, the excreta shall be buried in trenches of moderate depth, so located that there shall be no contamination of the ground water.

14. All sewage disposal systems shall be operated and maintained in a manner approved by the Department. Before any existing sewage disposal system is altered or any new sewage disposal system is constructed, the plans in relation thereto shall have been first approved by the Department.

House and Stable Wastes

15. No house slops, sink, laundry, garage or stable wastes, nor any other polluted liquid, shall be thrown or discharged into any spring, marsh, watercourse or reservoir, nor shall any such matter be thrown or discharged upon or into the ground within fifty (50) feet thereof, unless it shall have been previously purified in a manner deemed adequate by the Department (as through treatment with a disinfectant or filtration through the soil).

Dead Animals, Manure, Garbage and Other Refuse

16. No dead animal, manure, garbage, compost, vegetable or any putrescible matter shall be deposited in any spring, marsh, watercourse or reservoir, nor on nor in the ground within fifty (50) feet thereof, nor anywhere in such manner that it can be washed by rain, melting snow or otherwise over the surface of the ground into any spring, marsh, watercourse or reservoir.

Places Where Dung May Accumulate

17. All stables, pigsties, poultry or barnyards, slaughterhouses, standing places for horses or cattle, and all other places where animal dung or urine may accumulate, shall be so arranged and maintained that no washings or drainage therefrom shall flow (whether through open or covered drains or channels or otherwise) into any spring, marsh, watercourse or reservoir unless such matter shall have been previously purified in a manner deemed adequate by the Department.

Manufacturing and Other Similar Wastes

18. No filth, decaying or putrescible matter, waste product or polluted liquid from any factory, creamery, mill, tannery, garage or establishment of

any other kind shall be discharged, drained or washed into any spring, marsh, watercourse or reservoir, unless such matter shall have been previously purified in a manner deemed adequate by the Department.

Washing, Bathing and Swimming

19. No clothes or unclean objects of any kind shall be washed in any spring, marsh, watercourse or reservoir. Bathing and swimming is prohibited in any watercourse or reservoir owned by the city of New York.

Interments

20. No interment shall be made within one hundred and thirty (130) feet of any spring, marsh, watercourse or reservoir, nor in such manner and place as to result in any pollution thereof. In the case of a reservoir whose waters are delivered directly into an aqueduct or pipe line for transportation to the city of New York, such distance shall be three hundred (300) feet. On the Long Island watershed no new cemetery shall be established within one-half mile of any reservoir.

General Clause

21. In addition to observing the foregoing requirements, all persons living on or visiting a watershed shall refrain from any action, though not heretofore specified, which may result in contamination of any portion of the water supply of the city of New York.

WILLIAM WILLIAMS,
Commissioner of Water Supply, Gas and Electricity

The foregoing rules and regulations are hereby approved this 1st day of February, 1917.

LINSLY R. WILLIAMS,
Acting State Commissioner of Health

Penalties

For the violation of any of the above rules or regulations relating to a permanent source or act of contamination of any public supply of potable water of the city of New York, or for noncompliance therewith, the State Department of Health hereby imposes penalties, as follows:

For a violation of the provisions of Rules 8, 9, 10, 11, 18 or 20 a penalty of twenty-five dollars ($25) for the first violation and a penalty of fifty dollars ($50) for each additional violation.

For a violation of the provisions of Rule 12 a penalty of fifteen dollars ($15) for the first violation and a penalty of thirty dollars ($30) for each additional violation.

For a violation of the provisions of Rules 13, 14, 15, 16 and 17 a penalty of ten dollars ($10) for the first violation and a penalty of twenty dollars ($20) for each additional violation.

For a violation of the provisions of Rules 19 and 21 a penalty of five dollars ($5) for the first violation and a penalty of ten dollars ($10) for each additional violation.

THE STATE DEPARTMENT OF HEALTH,
By
LINSLY R. WILLIAMS,
Acting State Commissioner of Health

February 1, 1917

TARRYTOWN

In the matter of the amendment to the rules and regulations for the protection from contamination of the public water supply of the village of Tarrytown, made by the State Department of Health on December 7, 1914.

Under the provisions of section 70 of the Public Health Law the rules and regulations made, ordained and established on December 7, 1914, for the protection from contamination of the public water supply of the village of Tarrytown are hereby amended so that Rule 15 shall read as follows:

"(15) No boating of any kind, or fishing from boats, or through the ice, or any trespassing whatever shall be allowed in or upon the waters or ice of the reservoirs. No ice cutting shall be done except with the permission and under the rigid inspection and supervision of the Board of Water Commissioners. No skating shall be allowed except upon the upper lake and only at specifically stated times under the strict supervision of the Board of Water Commissioners. During such skating periods the Board of Water Commissioners shall provide police patrol to prevent any infringement of these rules and regulations and shall post at frequent and conspicuous intervals around the lake suitable signs containing Rules 7, 8, 9 and 15 of the Rules and Regulations as hereby amended."

The foregoing amendment to the Rules and Regulations for the protection from contamination of the public water supply of the village of Tarrytown, Westchester County, N. Y., is hereby duly made, ordained and established on this 15th day of November, 1917, pursuant to the provisions of the Public Health Law, constituting chapter 45 of the Consolidated Laws.

M. NICOLL, Jr.
Deputy State Commissioner of Health

This amendment to the rules and regulations, to be operative and valid, must be published at least once each week for six consecutive weeks in at least one newspaper in Westchester county, and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the amendment to the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the village of Tarrytown.

WELLSVILLE

Rules and regulations for the protection from contamination of the public water supply of the village of Wellsville, Allegany county.

Enacted by the New York State Commissioner of Health under chapter 49 of the Laws of 1909, constituting chapter 45 of the Consolidated Laws, as finally amended by chapter 665 of the Laws of 1915, (Public Health Law).

Rules and regulations

The rules and regulations hereinafter given, duly made and enacted in accordance with the provisions of sections 70, 71 and 73 of chapter 45 of the Consolidated Laws (Public Health Law) as heretofore set forth shall apply to that portion of the Genesee river and its tributary watercourses located within the State of New York and above the intake of the public water supply of the village of Wellsville, Allegany County, N. Y., these streams being sources of the public water supply of the village of Wellsville. The term "watercourse" wherever used in these rules is intended to mean and include every spring, pond, reservoir, stream, ditch, gutter or other channel of any kind the water of which when running whether continuously or occasionally eventually flows or may flow into the public water supply of the village of Wellsville.

Wherever a linear distance of a structure or object from a watercourse is mentioned in these rules, it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the margin or precipitous bank forming the ordinary highwater mark of such watercourse.

Privies, Adjacent to Any Reservoir or Watercourse

1. No privy, privy vault, pit, cesspool or any other receptacle of any kind used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, maintained, or allowed to remain within fifty (50) feet of any watercourse within the State of New York tributary to the public water supply of the village of Wellsville.

2. No privy, privy vault, pit, cesspool or any other receptacle used for the permanent deposit of human excreta, shall be constructed, located, placed, maintained, or allowed to remain within one hundred fifty (150) feet of any watercourse within the State of New York tributary to the public water supply of the village of Wellsville.

3. No cesspool, pit or other receptacle of any kind used for the temporary storage of human excreta or sewage shall be constructed, located, maintained or allowed to remain between the limiting distances prescribed by Rule 1 and the limiting distances prescribed by Rule 2, unless said cesspool, pit or other receptacle is so arranged and equipped that the said excreta or sewage are at once removed by pump or other satisfactory means through watertight pipes or conduits to some proper place of ultimate disposal, as hereinafter provided, or unless suitable vessels or receptacles for the temporary storage of said human excreta or sewage are provided and at all times maintained in an absolutely watertight condition and in such manner as to permit of convenient removal of said excreta or sewage to some place of ultimate disposal as hereinafter set forth.

4. The excreta collected in the aforesaid temporary receptacles permitted under Rule 3 shall be removed and the receptacles thoroughly cleaned and deodorized as often as may be found necessary to maintain the privy in proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundation or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of disposal hereinafter specified, and that the contents, while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to occupants of the premises and the adjacent premises.

5. Unless otherwise specially ordered or permitted by the State Department of Health, the excreta collected in the aforesaid temporary receptacles permitted under rule 3 shall, when removed, be disposed of by burying in trenches or pits at a depth of not less than 18 inches below the surface and at a distance not less than three hundred (300) feet from any watercourse within the State of New York tributary to the public water supply of the village of Wellsville.

6. Whenever, owing to the character of the soil or of the surface of the ground, or owing to the height or flow of subsoil or surface water, or other special local conditions, it is considered by the State Commissioner of Health that excremental matter from any privy or aforesaid receptacles, or from any trench or place of disposal or the garbage or wastes from any dump, may be washed over the surface or through the soil in an imperfectly purified condition into any watercourse, then the said privy or receptacle for excreta or the trench or place of disposal or the said garbage or waste dump, shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Wastes, Etc.

7. No house slops, bath water, sewage or other excretal matter from any water closet, privy, cesspool or other source shall be thrown, placed, led,

conducted, discharged or allowed to escape or flow in any manner either directly or indirectly into any watercourse within the State of New York tributary to the public water supply of the village of Wellsville, nor shall any such matters be thrown, placed, led, discharged or allowed to escape beneath the surface except into watertight receptacles, the contents of which are to be removed as provided by rule 4 within one hundred fifty (150) feet of any such watercourse tributary to the public water supply of the village of Wellsville.

8. No garbage, putrescible matter, kitchen or sink wastes, refuse or waste water, from any creamery, cheese factory, laundry nor water in which clothing, bedding or carpets have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into any watercourse, nor shall any such liquid or solid refuse or waste be thrown, discharged or allowed to escape or remain upon the surface of the ground or to percolate into or through the ground below the surface in any manner whereby the same may flow into any watercourse within a distance of one hundred (100) feet from any watercourse within the State of New York tributary to the public water supply of the village of Wellsville.

9. No clothing, bedding, carpets, nor anything that pollutes water, shall be washed, rinsed, or placed in any watercourse within the State of New York tributary to the public water supply of the village of Wellsville.

Bathing, Animals, Manure, Compost, Etc.

10. No person shall be allowed to bathe, nor shall any animals or poultry be allowed to stand, wallow, wade or swim in any watercourse, nor be washed therein within one thousand (1,000) feet above the intake of the Wellsville water supply. No watering place shall be maintained in such a way as to pollute with muddy leachings or excretal matters any streams within the State of New York tributary to the public water supply of the village of Wellsville.

11. No stable for cattle or horses, barnyard, hogyard, pig-pen, poultry house or yard, hitching place or standing place for horses or other animals, manure pile or compost heap, shall be constructed, placed, maintained or allowed to remain with its nearest point less than twenty-five (25) feet from any watercourse within the State of New York tributary to the public water supply of the village of Wellsville, and none of the above named objects or sources of pollution shall be so constructed, placed, maintained or allowed to remain where or in such a manner that the drainings, leachings or washings from the same may enter any such watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainings, leachings or washings shall have percolated over or through the soil in a scattered dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than twenty-five (25) feet before reaching any watercourse within the State of New York tributary to the public water supply of the village of Wellsville.

12. No human excreta and no compost or other matter containing human excreta shall be thrown, placed or allowed to escape into any watercourse, nor to be placed, piled or spread upon the surface of the ground at any point on the watershed within the State of New York tributary to the public water supply of the village of Wellsville, nor shall such human excreta or compost or other matter containing human excreta be dug or buried in the soil at a less depth than 18 inches below the surface nor within a distance of three hundred (300) feet from any watercourse within the State of New York tributary to the public water supply of the village of Wellsville, and no manure or compost of any kind shall be placed, piled or spread upon the ground within a distance of twenty-five (25) feet from any watercourse within the State of New York tributary to the public water supply of the village of Wellsville.

13. No decayed or fermented fruit or vegetables, cider mill wastes, roots, grain or other vegetable refuse of any kind shall be thrown, placed, discharged

or allowed to escape or pass into any watercourse, nor shall they be thrown, placed, piled, maintained or allowed to remain in such places that the drainage, leachings or washings therefrom may flow by open, blind or covered drains or channels of any kind into any watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that sufficient purification has been secured unless the above mentioned drainings, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred (100) feet before entering any watercourse tributary to the public water supply of the village of Wellsville.

Dead Animals, Offal, Manufacturing Wastes, Etc.

14. No dead animals, bird, fish or any part thereof nor any offal or waste matter of any kind, shall be thrown, placed, discharged or allowed to escape or to pass into any watercourse. Nor shall any such material or refuse be so located, placed, maintained, or allowed to remain that the drainage, leachings or washings therefrom may reach any such watercourse without having first percolated over or through the soil in a scattered dissipated form and not concentrated in perceptible lines of drainage for a distance of one hundred and fifty (150) feet before entering any watercourse within the State of New York, tributary to the public water supply of the village of Wellsville.

Labor Camps

15. No temporary camp, tent, building or other structures for housing laborers engaged on construction work or for other purposes shall be located, placed or maintained within a distance of three hundred (300) feet from any watercourse within the State of New York tributary to the public water supply of the village of Wellsville.

Cemeteries

16. No interment of a human body shall be made within a distance of three hundred (300) feet from any watercourse within the State of New York tributary to the public water supply of the village of Wellsville.

Inspections

17. The commissioners of the water and light department of the village of Wellsville shall make regular and thorough inspections of the streams and drainage areas tributary thereto for the purpose of ascertaining whether the above rules and regulations are being complied with, and it shall be the duty of said commissioners to cause copies of any rules and regulations violated to be served upon the persons violating the same with notice of such violations; and if such persons served do not immediately comply with the rules and regulations it shall be the further duty of the commissioners of the water and light department to promptly notify the State Commissioner of Health of such violations. The commissioners shall report in writing annually on the first of January, the results of the regular inspection made during the preceding year stating the number of inspections which have been made, the number of violations found, the number of notices served and the general condition of the watershed at the time of the last inspection.

Penalty

18. In accordance with section 70 of chapter 45 of the Consolidated Laws (Public Health Law), the penalty for each and every violation of or noncompliance with any of these rules and regulations which relate to a permament source or act of contamination, is hereby fixed at two hundred ($200) dollars.

The foregoing rules and regulations for the protection from contamination of the public water supply of the village of Wellsville are hereby duly made,

ordained and established on this 15th day of August, 1917, pursuant to chapter 45 of the Consolidated Laws (Public Health Law) of the State of New York, as finally amended by chapter 665 of the Laws of 1915.

HERMANN M. BIGGS,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations to be operative and valid must first be published at least once each week for six consecutive weeks in at least one newspaper in Allegany county and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the village of Wellsville.

INSPECTIONS OF VIOLATIONS OF RULES FOR THE PROTECTION OF PUBLIC WATER SUPPLIES

During 1917, inspections of violations of the rules and regulations were made and the necessary orders to local boards of health issued in connection with the water supplies of the following municipalities:— Elmira, Ithaca (Cornell University), New Rochelle, Nyack and Yonkers.

REPORTS OF VIOLATIONS OF WATER SUPPLY PROTECTION RULES SUBMITTED UNDER GENERAL ORDER

Under section 71 of the Public Health Law, a general order was issued in December, 1912, requiring local officials in charge of the water supplies for which rules and regulations had been enacted to report in writing on the first day of January of each year the detailed results of the regular inspections of the water supply and the steps taken to abate any violations found. All rules enacted since 1912 have contained a similar requirement.

Upon receipt, the reports of these water works officials are carefully reviewed and in cases where violations are reported as existing, the Engineering Division takes the necessary action for the abatement of such violations.

INVESTIGATION OF PUBLIC WATER SUPPLIES

It is obvious that no branch of the work of the Engineering Division is of greater moment in the protection of public health than the work of investigating and supervising the sanitary quality of public water supplies. Following the policy carried out during recent years special attention has been given to this work in 1917. Five hundred out of a total of 530 public water supplies in the State have now been fully investigated. Although the number of supplies investigated for the first time was only 30 in 1917, the prosecution of the water supply investigation work involved reinspection of supplies previously inspected and the total number of supplies covered was 130.

As in the past, these investigations have involved in the majority of cases, careful field inspection and collection of samples of water for analysis and the preparation of reports embodying the results of such investigations together with conclusions and recommendations for improvements. In each case these reports have been transmitted to the local authorities and in many instances marked improvements have been brought about as a result of these investigations and reports.

ADDISON

ADDISON WATER CO., *Addison, Steuben County, N. Y.:*

GENTLEMEN.—In regard to the use of water from a well as an auxiliary to the water supply furnished by you to the village of Addison, I wish to advise you as follows:

According to an inspection by Mr. Baker, assistant engineer in this Department, the well that it is proposed to use is one that was formerly used in connection with the supply and located near an old mill about 40 feet from the Canisteo river. The well is dug to a depth of about 23 feet, is curbed with masonry and provided with a steel manhole leading to the surface. The strata consist of clay and mill refuse to a depth of 18 or 20 feet. Below this is a layer of sand and gravel which extends nearly to the bottom of the curbing. The curb, however, terminates in a stratum of clay which forms the bottom of the dug portion of the well. In the bottom of the well several pipes are driven through this clay stratum for a distance of about 7 feet into a water bearing sand stratum. Another group of pipes is driven to a depth of about 14 feet through the sand stratum mentioned above and through a blue silt stratum into a second water-bearing stratum of sand and gravel and still a third group of wells is driven to a depth of about 20 feet through the strata mentioned above and through another clay stratum into a third water bearing sand stratum. It is assumed that the majority of the supply of the wells comes from these pipes and that little water enters through the curb from the upper water-bearing stratum. The water in the

well stood at an elevation of about 8 or 10 feet from the surface and higher than the elevation of the water in the river at the time of the inspection. The sanitary condition in the vicinity of this well is very unsatisfactory. There is only one privy located at a distance of about 45 feet and another about 100 feet distant. There are also 5 or 6 privies located between 100 and 500 feet from the well in addition to which there are three cesspools in this vicinity. The privies are all provided with earthen vaults only and the cesspools are not watertight. It is thus apparent that the ground water in this vicinity receives considerable pollution from these insanitary conditions and it seems quite probable that this pollution must at times find its way into the well either by seepage through the well curb or the clay strata which may not in all cases be continuous or which if continuous are undoubtedly penetrated by the pipes of numerous private houses located in the vicinity.

You will doubtless recall that in our report made under date of December 19, 1916, we made the following recommendations:

1. That steps be taken immediately by the Water Company to remove the source of pollution on the watershed of Jennings brook particularly at the house above the reservoir, and in case there is any difficulty in accomplishing this satisfactorily the water company should apply to this Department for the enactment of rules and regulations to properly protect the watershed.
2. That the present well supply be abandoned and if necessary a new supply be obtained, adequate in quantity and satisfactory in quality.

This second recommendation advises discontinuing the use of wells similarly located to that one described above and that pollution finds its way into this well is indicated by the results of an analysis of a sample of the water collected and sent to the Division of Laboratories and Research by Dr. W. E. Barron, Health Officer. These results show a bacterial count of 20,000 and colon bacilli present in all of the 10 c.c., 1 c.c. and 1/10 c.c. dilutions thus indicating the presence of active and potentially dangerous contamination.

In view of the above I would not consider water from this well supply safe for potable purposes. If, however, an emergency should arise making it necessary to use the water from this source or from the other wells in connection with the supply the insanitary conditions in the vicinity of the well should be abated and apparatus should be provided and the water sterilized with liquid chlorine.

So far as we have been able to determine you have taken no action on recommendation No. 1 of our previous report regarding improving the sanitary condition upon the watershed tributary to the regular supply. This is a matter of prime importance and I trust that you will give it your careful consideration.

Assuring you of our cooperation in the securing of a pure and wholesome water supply for the village of Addison, I am,

Yours very truly,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 22, 1917

ALBANY

Late in the year of 1917 investigations were made in the matter of the operation of the water purification plant of the city of Albany. As a result of these investigations, it was recommended that alum be used at all times in the purification process and compliance on the part of the city authorities with this recommendation was secured.

ALFRED

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the public water supply of the village of Alfred, Allegany county. An investigation of this supply was made on December 5, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Mr. George Jacox, commissioner of streets, and Dr. Emerson W. Ayars, health officer of the village.

Alfred is an incorporated village in the eastern part of Allegany county and about 10 miles southwest of Hornell. It is on a branch of the Canisteo river and is about 2 miles from Alfred station on the Erie railroad. The permanent population was estimated to be about 800. In addition to this there are for about 9 months of the year 350 students at Alfred University which is located in the village.

A private sewer serves the college and a few of the houses and the sewage after passing through a small settling tank is discharged into the creek. The remaining population of the village is served largely by septic tanks, cesspools and privies.

The water supply is owned by the village and is under the control of the board of trustees of which Mr. W. F. Burdick is president. The waterworks were constructed in 1902 under the supervision of the village officials.

The supply is obtained from several springs and drilled wells located about 2 miles west of the village. Another drilled well in the southwestern part of the village has not as yet been used. Water from the springs flows by gravity to a receiving basin while water from the drilled wells near the springs is pumped and delivered to the same receiving basin whence all of the water flows by gravity through the mains to the village and reservoir which is located in the southwestern part of the village. About 75 per cent of the permanent population and all of the buildings at the school are served by this water supply, making a population served of from 600 to 950. The average daily consumption was estimated to vary from 60,000 to 95,000 gallons. There are about 4 miles of water mains varying from four inches to 8 inches in diameter and about 175 service taps of which about one-fourth are metered. The average pressure in the village is about 90 pounds per square inch. Hydrants are placed in various parts of the village for fire protection.

The springs are developed by the construction of receiving chambers and lines of drainage tile extending from these chambers to intercept the ground water flow. The wells are located about 200 feet from the springs and are 6 inches in diameter and about 180 feet deep. About two-thirds of this depth was drilled through rock.

The water from the wells is pumped by oil pumping machinery, there being a complete outfit at each of the two wells operated by gasoline engines. The drilled well located near the village is 8 inches in diameter and 300 feet deep and all but 20 feet was drilled through rock. Water from this well is pumped by an air lift, the compressed air being furnished by a 10-horse power gasoline engine and a Type 12 Ingersoll Rand air compressor.

The reservoir is located on the side of the hill in the southwestern portion of the village and is constructed of concrete with a frame roof. This reservoir is about 50 feet square and 14 feet deep and has a capacity of 262,500 gallons which is equivalent to about three days' supply. The street mains are usually flushed out about twice a year.

Cattle occasionally pasture on the area surrounding the springs and pollution of animal origin can readily reach the ground water tributary to the springs. With this exception, and that of cultivated fields there is no other source of possible pollution near the springs.

At the time of the inspection a sample of the water was collected from a tap in the village and the analysis of this sample together with those made previously by the Division of Laboratories and Research will be found in the appended table.

From the results of these analyses, it will be seen that the water is usually clear and free from turbidity although occasionally it has a small amount of color. The water is quite hard and the figures for nitrogen in its various forms are usually low although occasionally those for nitrogen in the form of free ammonia, albuminoid ammonia and nitrates are high. These occasionally high figures together with the occasionally high chlorine indicate organic pollution of the ground water tributary to the springs. The total bacterial counts are at times very high and organisms of the B. coli group are frequently found. The results of the recent analyses, however, show an improvement over those previously obtained.

As a result of this investigation and of the analyses the following conclusion may be drawn:

That the present water supply if properly protected from surface wash from pastures and cultivated land in the vicinity of the springs should give a water of satisfactory sanitary quality.

In view of the above conclusions I would make the following recommendations:

That the village authorities construct an improved wire fence around the area surrounding the springs and this area be protected from surface wash by suitable and adequate drainage ditches.

I would further recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 28, 1917

REPORT OF WATER ANALYSIS FOR ALFRED

Source	Tap in village	Tap in village	Intake, deep well	Tap in village	Spring No. 1	Spring No. 2	Tap in village
Collected on	1/21/12	2/22/12	3/21/12	3/21/12	3/21/12	3/21/12	4/13/12
Color	5	tr.	5	5	5	tr.	tr.
Odor, hot	.....	.....	.....	.....	.....	.....	.....
Odor, cold	.....	.....	.....	.....	.....	.....	.....
Turbidity	10	cl.	tr.	tr.	3	cl.	cl.
Solids, total	203	239	252	255	153	201	211
Loss on ignition	.....	.....	.....	.....	.....	.....	.....
Mineral residue	183	204	211	231	129	175	186
Ammonia, free	.022	.016	.190	.078	.018	.014	.004
Ammonia, albuminoid	.032	.028	.018	.024	.058	.014	.006
Nitrites	.001	.001	.001	.001	tr.	tr.	.002
Nitrates	0.48	0.40	0.02	0.08	0.70	0.34	0.26
Oxygen consumed	0.60	0.30	0.20	0.10	0.90	0.20	tr.
Chlorine	0.75	1.25	0.25	5.50	1.00	1.50	0.63
Hardness, total	171.4	151.4	188.6	221.5	120.0	171.4	177.2
Alkalinity	158.0	149.0	186.0	210.0	104.0	163.0	175.0
Bacteria per c.c.	20,000	140	10	30	20	90	700
B. coli type 10 c.c.	+	+	—	+	+	—	+
B. coli type 1 c.c.	+	+	—	—	+	—	—
B. coli type 1/10 c.c.	+	—	—	—	—	—	—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

REPORT OF WATER ANALYSIS FOR ALFRED

Source	Tap in Village					
Collected on	10/7/12	1/13/13	3/10/13	5/2/13	6/9/13	12/5/16
Color	5	2	tr.	tr.	5	tr.
Odor, hot	.....	.....	.....	.....	.....	.....
Odor, cold	.....	.....	.....	.....	.....	.....
Turbidity	cl.	tr.	cl.	cl.	2	tr.
Solids, total	207	170	234	167	219	256
Loss on ignition	.....	.....	.....	.....	.....	33
Mineral residue	186	.....	.....	.....	.....	223
Ammonia, free	.006	.006	.008	.002	.024	tr.
Ammonia, albuminoid	.010	.016	.022	.016	.016	tr.
Nitrites	.001	tr.	tr.	tr.	tr.	.001
Nitrates	0.36	0.90	0.30	0.70	0.34	0.24
Oxygen consumed	0.60	0.30	0.60	0.20	0.80	0.50
Chlorine	1.25	1.00	1.25	1.00	1.00	1.00
Hardness, total	168.6	154.2	177.2	131.4	174.2	201.5
Alkalinity	165.0	132.0	177.0	127.0	164.0	189.0
Bacteria per c.c.	1,100	350	90	4,600	.....	5
B. coli type 10 c.c.	+	—	—	+	+	—
B. coli type 1 c.c.	+	—	—	—	—	—
B. coli type 1/10 c.c.	—	—	—	—	—	—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

ALTAMONT

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the sanitary condition of the public water supply of Altamont, made by Mr. C. M. Baker, assistant engineer, on December 4, 1917.

General information

Location.— Albany county on D. & H. R. R., 18 miles west of Albany.

Population.— 805, practically all being served with the water.

Source of supply.— A small stream tributary to Boxen Kill.

Consumption.— No definite information, but based on 100 gallons per capita consumption would be 80,000 gallons daily.

Distribution system.— Gravity supply. Distribution system consists of 5 miles of main 4 inches to 8 inches in diameter.

Service taps. — 153, only 8 of which are metered.

Pressure.— 60 pounds per square inch.

Storage.— Impounding reservoir 17,000,000 gallons.

Purification.— None.

References to previous investigations.— 1911, page 706, 32d annual report; rules and regulations, 1911, page 678, 32d annual report.

Due to the possibility of pollution of the supply from certain buildings on the watershed the following recommendations were made at the time of the previous investigation:

1. That the village take immediate steps to correct the insanitary conditions at the buildings just above the upper reservoir.
2. That the practice of cutting and harvesting ice from the upper reservoir be stopped.
3. That careful and regular sanitary patrol be made of the watershed whence this supply is derived.
4. That the village of Altamont apply to this Department for the enactment, by the Commissioner of Health, and as provided for in sections 70, 71 and 73 of the Consolidated Laws (Public Health Law), of rules and regulations for the protection of the water supply of the village.

Recommendations Nos. 2 and 4 have been carried out, ice is not now cut from the reservoir and rules and regulations were enacted by this Department in 1911. Recommendations Nos. 1 and 3, however, have not been carried out. Reports have been submitted to this Department annually by the village officials regarding the sanitary conditions on the watershed, but it is apparent from the information obtained at the time of this inspection, that regular patrols of the watershed are not made.

The area of the watershed is approximately 2 square miles and consists of a small basin lying on the summit of the northern part of the Helderberg mountains. There are in all some 14 houses on the watershed representing a total population of about 70 persons, or an equivalent of 35 per square mile. Except for two cases the houses are located well back from the stream.

One house and outbuildings are located at the top of a steep bank directly above the reservoir from which the supply is obtained. A stream passes just to the west of these buildings and enters the reservoir at a distance of about 1,000 feet. A privy is located at the top of a steep bank leading toward this stream about 75 feet distant. The privy is not provided with a vault. The land on the north side of the buildings slopes directly toward the reservoir. This land was heavily manured at the time of the inspection. Drainage from this area, however, could be easily diverted about the reservoir by the construction of a drainage ditch within the enclosure owned by the village. The privy mentioned above could be moved a distance of about 50 feet or so as to be located on this slope and pollution therefrom could then be diverted from the reservoir by the drainage ditch mentioned above.

A second house occupied by Edgar Armstrong is located near a small spring stream tributary to the supply at a point about ¾ of a mile above the intake. At this place a privy provided with no vault and a barn are located about 75 feet from the stream.

It is apparent from the above that considerable pollution at times finds its way into the supply from the sources mentioned above. Furthermore, there is also the danger of accidental, incidental or wilful contamination due to inhabitants and visitors upon the watershed.

Samples of the water were collected just prior to the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water usually somewhat high in color and turbidity. The figures for nitrogen in its various forms are moderate. Those for chlorine, however, are above normal. The bacterial counts are frequently high and colon bacilli are present in 10 c.c. inoculations in all but one of the 11 samples analyzed; they are occasionally present in dilutions as small as 1/10 c.c., thus indicating the presence of active and potentially dangerous contamination.

As a result of this investigation the following conclusions may be drawn:

1. That the public water supply of Altamont is subject to considerable pollution:
   (a) From the farm located just above the reservoir.
   (b) From the farm of Edgar Armstrong located near a tributary stream about ¾ mile from the reservoir.
   (c) From accidental, incidental or wilful pollution by inhabitants on the watershed and visitors thereto.
2. That the supply is unsatisfactory in physical qualities with respect to color and turbidity.

In view of the above I beg to offer the following recommendations to be acted upon by the village authorities:

1. That the unsatisfactory conditions on the watershed be improved:
   (a) By moving the privy at the farm located near the reservoir to a point where the drainage will be away from the small stream tributary to the supply and by constructing a drainage ditch so located within the enclosed area owned by the village as to prevent surface wash from the nearby buildings reaching the reservoir.

Every effort should also be made to maintain proper sanitary conditions on these premises.

(b) By providing the privy located at the farm of Edgar Armstrong with a watertight container and properly disposing of the contents therefrom at regular intervals. Furthermore, every effort should be made to maintain proper sanitary conditions at this farm to prevent, in every way possible, pollution from finding its way into the stream.

2. That purification of the supply consisting of filtration supplemented by sterilization with liquid chlorine, be provided as soon as possible.

3. That pending the installation of the complete purification plant, apparatus be provided and the supply be sterilized with liquid chlorine.

While sterilization of the supply with liquid chlorine will not improve its physical qualities it will render it safe for potable purposes if the apparatus is properly operated. This treatment can be carried out at a nominal cost and should be provided with as little delay as possible.

Finally I would recommend that copies of this report be sent to the various local officials and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 27, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT —=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Altamont	Albany	Tap, public supply	2/ 3/12	5	20	....	....	170	....	147	.024	.084	.001	1.20	2.40	2.25	117.2	105.0	1,100	+	+	—
Altamont	Albany	Tap, public supply	3/29/12	20	5	....	....	132	....	115	.014	.102	.001	0.72	3.20	1.25	80.0	66.0	1,700	+	—	—
Altamont	Albany	Tap, public supply	4/18/12	15	30	....	....	134	....	100	.006	.090	.001	0.72	2.30	1.25	80.0	63.0	900	+	—	—
Altamont	Albany	Tap, public supply	11/ 1/12	20	10	....	....	144	....	123	.006	.156	.002	0.80	4.20	1.50	95.7	88.0	1,300	+	+	—
Altamont	Albany	Tap, public supply	12/27/12	15	10	....	....	160	....	143	.028	.096	.001	0.64	2.30	2.00	120.0	105.0	170	+	—	—
Altamont	Albany	Tap, public supply	2/13/13	15	10	....	....	158	....	....	.024	.088	.001	0.70	2.50	2.00	108.6	101.0	100	+	—	—
Altamont	Albany	Tap, public supply	3/21/13	22	25	....	....	139	....	....	.034	.034	.001	0.70	4.50	1.75	81.4	60.0	4,100	+	—	—
Altamont	Albany	Tap, public supply	4/21/13	10	40	....	....	153	....	....	.012	.106	.001	0.60	3.50	1.75	100.0	87.0	400	+	—	—
Altamont	Albany	Tap, public supply	5/17/13	10	40	....	....	166	....	....	.026	.130	.003	0.50	4.30	1.25	100.0	95.0	700	+	+	—
Altamont	Albany	Tap, public supply	6/13/13	10	30	....	....	171	....	....	.008	.102	Tr.	0.60	4.30	1.25	125.8	107.0	50	+	+	+
Altamont	Albany	Tap, public supply	11/28/17	35	30	....	....	....	....	....	.028	.202	.003	0.60	6.20	2.60	108.6	90.0	350	3+0—	0+3—	0+3—

ALTAMONT (Private water supplies)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report of an investigation of the sanitary quality of several private water supplies at the summer residences of a small group of Albany people near Altamont.

This investigation was made at the request of Mr. Lewis R. Parker, of Albany, one of the summer residents referred to, on November 24, 1917. Mr. Parker stated that typhoid fever had occurred in one of the families of the summer colony and that there was a very general feeling of concern over the sanitary quality of these water supplies. He also advised us that the water from the village supply and from certain of the private supplies had been analyzed under the direction of the city of Albany and that they showed pollution. Mr. Parker desired, therefore, to obtain more definite information regarding the sanitary quality of these private supplies and of the village supply. In conjunction with the investigation of the private supplies an investigation has also been made of the village supply and this investigation has been made the subject of a separate report.

The investigation on which the present report is based was made by Mr. C. M. Baker, assistant engineer, on November 28, 1917. At this time a complete inspection was made of the various supplies and samples of water were collected and taken to the Division of Laboratories and Research for analyses. The results of these analyses are recorded in the appended table.

The supplies investigated were those of Miss Jennie Wasson, of Messrs. W. F. Mayer, Lewis R. Parker and John Becker, also the Estate of Charles Pruyn. The places are located on the side of the Helderberg mountains, 1 to 1½ miles southwest of the village of Altamont.

Wasson supply

The main supply used for potable purposes, is derived from a drilled well about 250 feet deep. The water is pumped from the well by means of an air-lift system into air pressure tanks located in the basement of the house. The sanitary conditions in the vicinity of the well appeared to be satisfactory at the time of the inspection and there appears to be little opportunity for pollution.

A secondary supply is obtained from a small pond fed by a surface stream. This supply is connected with outside hydrants only and is used exclusively for sprinkling purposes. Since this supply is not used for domestic purposes no samples of it were analyzed.

Analyses of samples of the water collected from the drilled well were made by the Laboratory Division, the results of which are stated in the appended table. These analyses show a high chlorine content, due in all probability to mineral deposits. The bacterial count was low and colon bacilli were not present. The results generally show the water to be free from active contamination.

Mayer supply

Mr. Mayer's supply is derived from a spring located on the side of the mountain above the house. The spring is walled up with stone masonry, the enclosed being about 8 feet in diameter. It is covered with a board cover. The area above the supply is woodland and was said to be seldom frequented by visitors. An embankment about the curb of the spring protects it from surface wash.

The analyses of the sample collected from this supply show the chlorine to be somewhat high though probably not abnormal, the bacterial count low and colon bacilli absent, thus indicating the water to be free from active contamination.

Parker supply

Mr. Parker's supply is obtained from springs located on the mountain side just south and adjacent to the Mayer supply. This supply is derived from several small springs protected by half barrels sunk into the ground. From the barrels the water is conducted to a collecting basin whence it flows by gravity to the house. Although these springs are located in woodland and there are no permanent sources of pollution in the vicinity, they are not adequately protected from surface wash.

Analysis of this water shows a rather high chlorine content and somewhat excessive hardness. The bacterial count was low, however, and colon bacilli were not found present, thus indicating the absence of active contamination at the time the samples were collected. While not actively contaminated, it is obvious that this supply should be more adequately developed:

(a) By the construction of more suitable basins about the springs.

(b) By the enclosure of an area about them with a substantially constructed fence.

(c) By the construction of drainage ditches within this enclosure to divert surface wash.

Pruyn supply

The supply for Mr. Pruyn's residence is derived from a spring developed similarly to that of Mr. Mayer's. The cover was not tight, however, and there appeared to be considerable opportunity for surface wash finding its way into this supply. The spring is located on the side of the mountain just south of the supply previously described.

Analyses of samples of water collected from this supply show water slightly colored and turbid at the time of the inspection. The figures for nitrogen in its various forms are moderate but those for chlorine appeared to be somewhat high although possibly not above normal. The water is very hard. The bacterial count was high and colon bacilli were found present in all 3 of the 10 c.c. and in one of the three 1 c.c. inoculations, thus indicating the presence of active contamination.

This supply should be more adequately developed:

(a) By the construction of a more substantial cover over the spring.

(b) By enclosing a suitable area about the spring with substantially constructed fence.

(c) By the construction of drainage ditches within this enclosure to constructed fence.

Becker supply

The supply for Mr. Becker's residence is derived from four different sources, namely, the Altamont village, an artesian well, and two shallow dug wells. The village supply, as previously stated, is described in a separate report.

The artesian well is located about 150 feet south of Mr. Becker's house, near a small natural drain. The well is 505 feet deep. A casing is sunk for a distance of about 25 feet nearly to the rock formation which in this vicinity consists of shale. At this point a heavy flow of water was encountered. The well was drilled on through the rock, however, to a total depth of 505 feet. The soil from the surface to the rock formation is said to consist principally of clay. A 2½-inch suction line was sunk through the casing mentioned above to the bottom of the well. Sediment settling between this pipe and the rock formation partly sealed the well and it was assumed that this seal would prevent the inflow of this water, from near the surface, into the lower part of the well. To dispose of the flow of water mentioned above the outer casing was tapped and a pipe laid for a distance of 30 or 40 feet whence this water was allowed to run to waste. At a distance of about 300 feet up the hill from the well is located a cesspool which receives the sewage from Mr. Mayer's place located about ⅛ mile above.

Samples of water collected from this well at the time of the inspection show a water high in color and turbidity, also a water with a very strong odor of hydrogen sulphide. The figures for nitrogen in the form of free and albuminoid ammonia and nitrates are high. Those for oxygen consumed are also high which, however, may be due in part to oxygen absorbed by the sulphides in the water. The figure for chlorine is excessively high and is probably due largely to mineral deposits. The hardness is low but the alkalinity is excessively high. While the bacterial counts are low, colon bacilli were found present in all three of the 10 c.c. inoculations thus indicating the presence of active and potentially dangerous contamination. Whether this pollution is due to the infiltration of water from near the surface, along the pipe leading into the well or to pollution finding its way into the ground water tributary to the supply from some more remote source cannot be definitely stated, nevertheless in view of the above, this supply cannot be considered safe for domestic purposes.

The shallow wells mentioned above are dug to a depth of 20 or 25 feet, are provided with only board covers and are equipped with chain pumps. One is located about 75 feet northwest of the house and the other about 60 feet east. The sewer from the house passes within a distance of about 75 feet from each of the wells. Due to the inadequate protection afforded by the board covers and the way in which the wells are developed, they probably receive considerable pollution from the surface. Furthermore, these wells may also be subject to pollution by sewage from nearby sewers or from Mr. Mayer's cesspool, which is about 300 feet above the wells.

Analyses of water from these wells showed a high and variable chlorine content. The bacterial count in the water from the well northwest of the house was high and colon bacilli were found in all 3 of the 10 c.c. and 1 c.c. inoculations and in 1 of the three 1/10 c.c. inoculations, thus indicating the presence of active contamination. The sample collected from the well east of the house, however, showed a somewhat lower bacterial count with colon bacilli present only in 1 of the 10 c.c inoculations.

In view of the above, the supply from these wells as now developed cannot be considered satisfactory for potable purposes.

It is thus apparent that none of the sources of supply on the premises of Mr. Becker furnish a water of a satisfactory sanitary quality. It seems necessary, therefore, that:

(a) The present supplies should be abandoned and a new supply developed from a satisfactory source, or,

(b) That, providing the village of Altamont carry out our recommendations regarding improving the sanitary quality of this supply, this supply be used.

Pending the carrying out of the recommendations of this Department by the village, the village supply could be rendered absolutely safe by boiling.

Finally, it is apparent from this investigation that, with the exception of the water supplies of Mr. Becker, the others, by proper development, can be made to furnish water satisfactory for domestic purposes. It is evident, however, that none of the sources of supply on the premises of Mr. Becker are satisfactory and that a new supply should be developed from some other source in the vicinity free from pollution or that, subject to the improvements recommended in our recent report on the Altamont supply under date of December 27, 1917, the village supply be used.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 31, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c	1-10 c.c.
Altamont	Albany	Wasson, artesian well	11/28/17	....	....	....	....	....	....	....	....	....	....	....	....	0.58	.....	.....	25	0+3−	0+3−	0+3−
Altamont	Albany	Mayer, spring	11/28/17	....	....	....	....	....	....	....	....	....	....	....	....	0.03	.....	.....	80	0+3−	0+3−	0+3−
Altamont	Albany	Parker, composite of springs	11/28/17	....	....	....	....	....	....	....	.008	.044	....	0.10	1.3	1.6	195.0	193.0	50	0+3−	0+3−	0+3−
Altamont	Albany	Pruyn, spring	11/28/17	10	4	....	....	....	....	....	.012	.082	Tr.	0.02	1.8	2.0	110.5	107.0	275	3+0−	1+2−	0+3−
Altamont	Albany	Becker, artesian well. Hydrogen sulphide odor. Oxygen consumed 15.3 absorbed in the cold (probably by sulphides or hydrogen sulphide).	11/28/17	35	110	H^2S 3	2	....	....	....	.240	2.57	Tr.	3.00	16.2	380	4.8	626.0	15	3+0−	1+2−	0+3−
Altamont	Albany	Becker, dug well, northwest of house	11/28/17	....	....	....	....	....	....	....	....	....	....	....	....	2.00	.....	.....	180	3+0−	3+0−	1+2−
Altamont	Albany	Becker, dug well east of house	11/28/17	....	....	....	....	....	....	....	....	....	....	....	....	6.00	.....	.....	30	1+2−	0+3−	0+3−

ANDOVER

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the public water supply of the village of Andover, Allegany county. An investigation of this supply was made on December 5, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. E. J. Laughlen, health officer of the village.

Andover is an incorporated village in the southeastern part of Allegany county and about 15 miles southeast of Hornell. It is on a tributary of the Genesee river and on the Erie railroad. The population at the time of the inspection was estimated to be about 1,200.

There is one public sewer which serves a small portion of the village. The remaining portions of the village are served by septic tanks, cesspools and privies.

The water supply is owned by the village and is under the control of the board of trustees. The waterworks were constructed by contract in 1893. The water supply is obtained from several springs about 2 miles southwest of the village and from an auxiliary well supply at a local creamery.

About 1,020, or 85 per cent. of the total population, are served by this supply. The average daily consumption was estimated to be 102,000 gallons. There are 6½ miles of water mains varying from 4 to 6 inches in diameter. It is a gravity supply and the average pressure in the village is about 80 pounds per square inch. There are 250 houses in the village, of which 210 are served by this supply, and of these only 6 are metered. Hydrants are placed in various parts of the village for fire protection.

The several springs from which the supply is obtained are located on the steep sides of a small brook. Water from these springs is collected in small spring chambers and conveyed to a main spring house from whence it flows through the pipe line to the village. Surplus water passes through the mains to the reservoir in the eastern part of the village or overflows at the spring house. The main spring chamber is about 12 feet in diameter and 8 feet deep.

The reservoir which is located on a hill in the eastern part of the village is about 75 feet in diameter and 11 feet deep. This reservoir is open and has a capacity of about 300,000 gallons. It is provided by the village to construct a new reservoir in the spring at a somewhat higher elevation, so that the pressure from the new reservoir will be about 100 lbs. per square inch. The proposed new reservoir is to be about 52 feet in diameter and 20 feet deep, and have a capacity of 300,000 gallons. The present reservoir is said to be cleaned out twice a year and the street mains are flushed out five times a year.

Cattle are pastured around the springs and some surface water may find its way into the spring chambers. There is one farm house on the watershed of the brook above the springs. The land adjacent to the springs and brook is very hilly and rocky. The brook above the springs has a watershed of about one-half square mile.

The creamery at which the auxiliary well supply is obtained is located in the western part of the village. The well is 8 inches in diameter and 205 feet deep. It was driven through 20 feet of gravel, 20 feet of clay, 20 feet of shale and the remaining distance through hard rock. An 8-inch casing extends from the surface to the hard rock. This supply is used only a short time each year during the dry season. The pumping station for the well is located in the creamery and the water is raised by an air lift from the well and is then pumped by the creamery pump into the village mains. There are about 6 houses within 500 feet of the creamery and 12 within 1,000 feet of the creamery. Most of the houses near the creamery are small and have outside privies. Some of the privies were in rather insanitary condition and drainage from many of them passes into the ground.

At the time of the inspection samples of water were collected from the spring supply and from the well supply and the analyses of these samples together with those previously made by the division of laboratories and research will be found in the appended table.

The analysis of the sample from the spring supply collected at the time of the inspection shows a water clear, colorless and moderately soft. The figures for nitrogen in its various forms are comparatively low with the exception of that for nitrates. The somewhat high figure for nitrates indicates a small amount of organic pollution of vegetable or animal origin, rendered inactive, however, by natural processes of purification. The total bacterial count is low and organisms of the B. coli type were not found in any of the inoculations tested.

The analysis of the sample from the well supply shows a clear and colorless water with a high potassium or sodium alkalinity. At the time of collection a slight odor of hydrogen sulphide was noticed and the high figures for free ammonia and chlorine taken in conjunction with this occurrence of hydrogen sulphide and high temporary hardness indicate a somewhat mineralized water. The total bacterial count is low and organisms of the B. coli type were not found in the inoculations tested. In view of the location of the well in a populated district with leaching privies in the vicinity it is possible that samples from this well taken under different hydraulic conditions of the ground water might show active contamination.

The samples collected prior to the inspection were apparently from the spring supply. The analyses of these samples show varying figures for nitrogen, chlorine and oxygen consumed. At times the supply has been colored and turbid with high bacterial counts and organisms of the B. coli type in inoculations as small as 1/10 c.c., these results indicating that the supply has received active contamination by surface wash from adjacent pastures.

As a result of this investigation and of the analyses the following conclusions may be drawn.

1. That the springs from which the regular water supply of the village of Andover is obtained should furnish a water of satisfactory sanitary and physical quality if properly protected from surface wash and contamination by cattle.
2. That the auxiliary well is unsatisfactorily located with respect to proximity to potential sources of contamination and, furthermore, the water is of a somewhat undesirable physical quality due to its mineralization.

In view of the above conclusions, I would make the following recommendations:

1. That the village authorities construct a wire fence around the area upon which the springs are located and divert surface wash therefrom by means of adequate and proper drainage ditches.
2. That, in view of its unsatisfactory location, the village consider the abandonment of the auxiliary well supply and the further development of the spring supply or the development of some other satisfactory supply to be used as needed.

In conclusion, I would further recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 28, 1917

REPORT OF WATER ANALYSES FOR ANDOVER

Source	Tap in Village	Tap in Village	Tap in Village	Tap in Village	Tap in Village
Collected	1/20/12	2/22/12	4/13/12	10/5/12	11/22/12
Color	15	tr.	5	tr.	1
Odor, hot	.....	.....	.....	.....	.....
Odor, cold	.....	.....	.....	.....	.....
Turbidity	10	cl.	cl.	cl.	tr.
Solids, total	70	47	46	45	50
Loss on ignition	.....	.....	.....	.....	.....
Mineral residue	50	36	29	25	42
Ammonia, free	.070	.012	.002	.004	.014
Ammonia, albuminoid	.134	.032	.028	.016	.056
Nitrites	.002	tr.	tr.	.001	tr.
Nitrates	0.80	1.08	0.80	0.80	1.20
Oxygen consumed	3.50	1.00	0.40	0.60	0.60
Chlorine	3.50	1.50	1.25	1.50	0.75
Hardness, total	23.4	22.1	19.5	22.1	39.0
Alkalinity	14.0	21.0	17.0	18.0	18.0
Bacteria per c.c.	5,600	1,600	50	30	90
B. coli type 10 c.c.	+	+	+	+	+
B. coli type 1 c.c.	+	+	—	—	—
B. coli type 1/10 c.c.	+	—	—	—	—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

REPORT OF WATER ANALYSES FOR ANDOVER

Source	Tap in Village	Tap in Village	Tap in Village	Tap in Village	Spring supply	Well supply
Collected on	1/13/13	3/10/13	5/2/13	6/9/13	12/5/13	12/5/16
Color	20	tr.	7	2	tr.	tr.
Odor, hot	.....	.....	.....	.....	1 v	1 v
Odor, cold	.....	.....	.....	.....	1 v	*1 v
Turbidity	20	cl.	3	2	cl.	tr.
Solids, total	91	56	70	53	56	595
Loss on ignition	.....	.....	.....	.....	18	15
Mineral residue	.....	.....	.....	.....	38	580
Ammonia, free	.008	.006	.004	.004	.002	.142
Ammonia, albuminoid	.092	.010	.054	.016	.010	.006
Nitrites	tr.	tr.	tr.	.001	.001	.003
Nitrates	1.00	0.70	1.00	0.50	1.40	0.02
Oxygen consumed	1.70	0.10	0.30	0.70	0.75	1.50
Chlorine	2.00	1.75	1.25	1.50	1.25	142.5
Hardness, total	26.0	22.1	22.1	19.5	28.6	40.3
Alkalinity	18.0	20.0	19.0	18.0	17.0	282.0
Bacteria per c.c.	16,000	250	350	100	10	20
B. coli type 10 c.c.	+	—	+	+	0+3—	0+3—
B. coli type 1 c.c.	+	—	—	+	0+3—	0+3—
B. coli type 1/10 c.c.	—	—	—	—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

* Slight H^2S odor at time of collecting sample.

ANGELICA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of the village of Angelica, made on April 5, 1917, by Mr. E. S. Chase, assistant engineer.

Angelica is an incorporated village with a population of 1,138 located in the central part of Allegany county, on the Pittsburg, Shawmut and Northern railroad, about 40 miles west of the city of Hornell. The village contains the shops of this railroad but otherwise is largely a residential and trading center for the surrounding agricultural country. There is no public sewer system in the village, the houses being served by privies and cesspools.

The public water supply is derived from a spring located about 6 miles northeast of the village, a short distance beyond the station of Bennetts, on the Pittsburg, Shawmut and Northern railroad. The waterworks were constructed by contract in 1897 under the direction of the designing engineer, Mr. J. F. Whitmer. About 1902 or 1903, 3 miles of the pipe line leading from the spring to the village were relaid. The waterworks are owned and operated by the village under the direction of the board of water commissioners, of which Mr. David H. Dodson is president and Mr. C. D. Buchanan is superintendent.

Practically the entire population of the village is served by the supply and the average daily consumption may be estimated at 50,000 gallons. A few private wells in the village are still in use. There are about 12 miles of water mains ranging from 6 to 8 inches in diameter. Of the 300 service taps some 100 are metered. The average pressure in the village is about 60 pounds per square inch. The spring is located at a sufficient elevation above the village to supply the water by gravity, but owing to the smallness of the pipe leading from the spring to the village and to some irregularity in alignment allowing the formation of air pockets, it is necessary to pump two or three times a week.

A reservoir on the side hill north of the village acts as a storage reservoir for a reserve supply in case of fire. The main leading to this reservoir is provided with check, gate and relief valves so adjusted as to prevent back flow from this reservoir except in the case of a serious drop in pressure in the distribution system or unless the gate valve is open. The reservoir is approximately 60 x 200 feet in plan, 12 feet deep and has a capacity of 450,000 gallons when filled to the point of overflow.

The spring has been developed by the construction of a masonry basin 14 x 22 feet in plan, 6 feet deep. This basin is covered with a wooden house. Approximately one-half of the surface of the basin is covered by a wooden flooring upon which is located the pumping equipment, consisting of a Rumsey triplex 6-inch by 8-inch pump, belted to a 7 horse-power Olin gas engine. The side walls of the basin extend a few inches above the surface of the surrounding ground and an overflow pipe leads into a ditch at an elevation a very little lower than that of the water level in the basin. At one end and outside of the spring basin is a small uncovered circular well built of masonry extending 2 or 3 feet above the ground. This well enters the same ground water as that of the spring and is undoubtedly more or less intimately connected with the water therein. This well is used by the inhabitants of a nearby house, the water being drawn by a bucket and rope. This house is located about 200 feet distant and at a higher elevation than the spring. Back of this house and still nearer the basin is located a cesspool receiving sink drainage. About 150 feet distant and at a higher elevation, although at a point where surface drainage is away from the direction of the well, is located a privy of the ordinary rural type. About 200 feet distant and on land sloping away from the spring are located barns, sheds and other outbuildings. No other houses are located within 1,000 feet of the spring. Probably the most serious condition, however, liable to bring about contamination of the well is the overflowing of the low land in which the spring is located by the flood waters of Black creek, several hundred feet distant. At times of flood the low land is covered with water which backs up through the overflow pipe and enters the spring basin. Such a flood had occurred a week or so prior to the time of this inspection.

At the time of the inspection a sample of the water was collected from a tap in the village and the results of this analysis, together with others made in the past by the Division of Laboratories and Research, will be found in the appended table.

These analyses show a water usually clear and colorless and moderately soft. The figures for nitrogen in its various forms are usually low and indicate moderate amounts of decomposing and decomposable organic matter. At times, however, the water has been somewhat colored and turbid, and these results probably occurred at such times as the spring was contaminated by flood water. The bacterial counts are comparatively low, with a few exceptions, and organisms of the B. coli type usually absent in the 10 c.c. inoculations. At times, however, the bacterial counts have been high and organisms of the B. coli type present, indicating the occurrence of contamination by surface wash at times of flood.

In view of the above facts the following conclusions may be drawn:

1. That the public water supply of Angelica is derived from a source which if properly protected from contamination should furnish a supply of satisfactory sanitary and physical quality.
2. That the open well adjacent to the north end of the spring basin affords a possible means whereby contamination of the ground water tributary to the spring may be brought about.
3. That the location of the pumping equipment in the spring house over the spring basin affords opportunity for accidental contamination of the supply by the attendants at the station.
4. That serious contamination of the spring may be brought about by flooding of the basin or by the backing up of surface water through the overflow therefrom.
5. That the barn yard, privy and cesspools belonging to the nearby farm-house constitute possible sources of contamination of the ground water tributary to the spring.
6. That the necessity of pumping is due in all probability to improper alignment of the pipe line to the village.

I would, therefore, recommend:

1. That the well adjacent to the spring basin be covered and provided with a pump arranged in such a way that pumped water cannot flow back into the well.
2. That the walls of the spring basin and the overflow pipe therefrom be raised to an elevation above flood waters.
3. That, when the spring basin walls are raised, the pumping equipment be placed either in a separate building or that a portion of the spring house containing it be tightly sealed from the basin holding the spring water.
4. That care should be exercised to prevent contamination of the ground water from nearby sources of pollution and if, after the carrying out of the above recommendations, future analyses indicate contamination, steps be taken to secure the control of the nearby farm buildings and remove such sources of contamination as may menace the quality of the supply.
5. That, in order to eliminate the necessity of pumping, a survey be made of the pipe line to the village in order to discover at what points the line rises above the hydraulic gradient and to correct such conditions as may be found to retard the free flow of water through the mains.

I would further recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 9, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hour.	10 c.c.	1 c.c.	1-10 c.c.
Angelica	Allegany	Tap, public supply	4/20/11	Tr.	Cl.						.120	.034	.001	0.80	0.30	1.75	56.0	48.0	40	—	—	—
Angelica	Allegany	Tap, public supply	6/10/11	10	10						.140	.244	.005	0.10	3.80	1.25	57.0	52.0	400	+	—	+
Angelica	Allegany	Tap, public supply	1/20/12	Tr.	Cl.						.014	.008	.001	0.60	0.20	1.37	64.0	53.0	325	—	—	—
Angelica	Allegany	Tap, public supply	2/26/12	Tr.	Cl.						.010	.018	Tr.	0.60	0.50	1.25	57.0	47.0	4,000	—	—	—
Angelica	Allegany	Tap, public supply	4/12/12	Tr.	Cl.						.002	.012	.001	0.50	Tr.	1.75	57.0	53.0	110	—	—	—
Angelica	Allegany	Tap, public supply	10/ 5/12	5	Tr.						.004	.018	.003	0.40	1.90	2.00	67.0	56.0	250	—	—	—
Angelica	Allegany	Tap, public supply	11/22/12	Tr.	Cl.						.010	.042	Tr.	0.60	0.70	2.00	56.0	53.0	10	—	—	—
Angelica	Allegany	Tap, public supply	1/13/13	15	3						.016	.012	.030	0.24	0.60	1.75	70.0	56.0	50	—	—	—
Angelica	Allegany	Tap, public supply	3/ 8/13	Tr	Cl						.010	.016	Tr	0.50	0.40	1.75	56.0	51.0	20	—	—	—
Angelica	Allegany	Tap, public supply	4/19/13	Tr	Cl.						.008	.014	.001	0.46	0.50	1.50	66.0	51.0	80	—	—	—
Angelica	Allegany	Tap, public supply	6/ 7/13	Tr.	Cl.						.010	.012	Tr.	0.30	0.20	2.00	66.0	57.0	240	—	—	—
Angelica	Allegany	Tap, public supply	9/21/13	Tr.	Cl.						.006	.008	.001	0.60	0.30	1.00	60.0	57.0				
Angelica	Allegany	Tap, public supply	4/20/15	Tr.	Cl.						.002	Tr.	.001	0.30	1.00	1.63	57.0	54.0	50	—	—	—
Angelica	Allegany	Tap, public supply	4/20/15																250	—	—	—
Angelica	Allegany	Tap, public supply	4/20/15																1,600	—	—	—
Angelica	Allegany	Tap, public supply	4/ 5/17	Cl.	Tr.	1 v.	1 v.				.008	.002	Tr.	Tr.	0.40	1.75	61.0	54.0	35	—	—	—

ARCADE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Arcade made by Mr. C. M. Baker, assistant engineer, on September 6, 1917.

Arcade is an incorporated village of about 1,568 inhabitants located in the southwestern corner of Wyoming county. It is on the Olean-Buffalo Branch of the Pennsylvania railroad, 36 miles southeast of Buffalo and is the southern terminus of the Buffalo, Attica and Arcade railroad. The village is located on Cattaraugus creek. About three-fourths of the population are connected with private sewer systems which discharge without purification into the creek.

The water supply is owned by the municipality and is under the supervision of the board of trustees. The supply was first installed and put into operation about 1896 but was formerly owned and operated by the Wyoming Water Supply Company, being taken over by the village in 1905 or 1906. Shortly after the village took possession, a 6-inch main in addition to the 4-inch main then in service, was constructed from the springs to the village and an additional spring developed.

The supply is derived from three springs located about 4½ miles southeast of the village from which the water flows by gravity to the distribution system, the excess over consumption going to a storage reservoir located near the village. Practically all of the inhabitants of the village are served with the water, there being some 500 service taps, only a few of which are metered. The distribution system in the village consists of about 5 miles of mains ranging from 3 inches to 6 inches in diameter. There are two supply mains from the springs to the village, one 4 inches and the other 6 inches in diameter. The pressure averages 80 or 85 pounds per square inch. Due to the lack of meters or other method of measuring the amount of water used no definite information could be obtained regarding the consumption.

The reservoir which is constructed of masonry and located on a hill about one mile southwest of the village, has a capacity of about 220,000 gallons. At the time of the inspection, however, it had been shut off in order to repair leaks that had developed.

Spring No. 1 is located on the side of a hill and consists of a collecting gallery about 12 x 60 feet in plan, which is curbed with concrete walls and covered with a wooden roof. This spring is located in pasture land but there appears to be no opportunity for surface water to find its way directly into the supply, and but little, if any, chance for pollution by rapid infiltration of surface water since the slope about the spring is steep and is probably seldom frequented by cattle.

Spring No. 2 consists of a similar collecting gallery about 25 x 100 feet in plan located in swampy land in the bottom of a natural amphitheatre. The hill forming this amphitheatre rises to an elevation of about 100 feet above the level of the spring. To the northeast at a distance of about one-fourth of a mile is located a small lake or pond which has no visible outlet. A small brook fed by swampy land just above the collecting gallery flows near the western wall and a large portion of the water of this brook disappears along the wall and undoubtedly finds its way into the spring. The spring is located in pasture land and is not protected by a fence or drainage ditches and it seems probable, therefore, that polluted surface water at times finds its way into this spring. The area of the amphitheatre does not exceed 10 or 15 acres and by enclosing this area with a suitable fence and by constructing drainage ditches to divert surface wash, this pollution could be prevented.

Spring No. 3 is located near spring No. 1 in low, flat pasture land. This spring is at a lower elevation than spring No. 1, the flow from it being controlled by a pressure regulating valve which allows the water to flow into the main leading to the village only when the supply from spring No. 1 is exhausted. Spring No. 3 is not enclosed by a fence nor are drainage ditches provided to divert the surface wash.

Samples of water from the various sources were collected at the time of

the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but a water that is high in hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are moderate but those for nitrates and chlorine appear to be somewhat above normal. The bacterial counts are low in all cases except in the samples collected at the time of the inspection, in which case the high counts are probably due to delay in transit, 4 days elapsing from the time samples were collected until they were received at the laboratory. Colon bacilli have been found present in only one of the 10 c.c inoculations of the 11 samples tested, thus indicating little active contamination.

As a result of this investigation, it may be concluded:

1. That the public water supply of Arcade is derived from sources which if properly protected from pollution should furnish a satisfactory supply of water.
2. That there appears to be, however, some opportunity for surface wash from pasture land to find its way into springs Nos. 2 and 3.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That the amphitheatre or a portion thereof about spring No. 2 be purchased by the village and enclosed by a suitable fence; also that drainage ditches be constructed within this area to divert surface wash from the pasture land above.
2. That a suitable area be enclosed by a fence about spring No. 3 and that drainage ditches be constructed within the enclosure to divert surface wash from finding its way into this source of supply.

Finally I would recommend that copies of this report be sent to the various local officials and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 21, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Arcade	Wyoming	Tap, public supply	4/11/12	Tr.	Cl.	....	....	132	....	106	.008	.032	Tr.	0.78	0.30	1.50	90.0	88.0	30	−	−	−
Arcade	Wyoming	Tap, public supply	9/25/12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	100	−	−	−
Arcade	Wyoming	Tap, public supply	11/14/12	Tr.	Cl.	....	....	130	....	113	.010	.044	Tr.	1.00	0.80	1.25	111.4	106.0	400	−	−	−
Arcade	Wyoming	Tap, public supply	12/19/12	Tr.	Cl.	....	....	118	....	104	.012	.022	Tr.	0.72	0.50	1.50	102.8	101.0	60	−	−	−
Arcade	Wyoming	Tap public supply	1/29/13	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	30	−	−	−
Arcade	Wyoming	Tap public supply	2/28/13	Tr.	Cl.	....	....	126	....	....	.022	.042	Tr	0.80	0.30	1.25	105.8	102.0	5	−	−	−
A cade	Wyoming	Tap public supply	4/ 8/13	Tr.	Cl.	....	....	135	....	....	.012	.048	.001	0.80	0.40	1.50	114.2	102.0	60	−	−	−
Arcade	Wyoming	Tap, pub ic supply	5/27/13	Tr.	Tr.	....	....	130	....	....	.006	.022	.003	0.80	0.60	1.75	108.6	100.0	.....	+	−	−
Arcade	Wyoming	Tap, public supply	7/15/13	Tr.	Cl.	....	....	133	....	....	.008	.034	.003	0.70	0.90	1.00	100.0	100.0	3,800	0+3−	0+3−	0+3−
Arcade	Wyoming	*Spring No. 1 supply	9/ 6/12	0	0	0	1a	....	....	....	.010	.008	0	1.00	0.70	2.00	111.4	116.0	650	0+3−	0+3−	0+3−
Arcade	Wyoming	*Spring No. 2 supply	9/ 6/17	5	0	0	1a	....	....	....	.026	.030	0	0.30	1.20	1.25	97.2	95.0				

* Sample four days in transit.

ARGYLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Argyle made by Mr. C. M. Baker, assistant engineer, on November 3, 1916.

Argyle is an incorporated village of 223 inhabitants, according to the 1915 census, located in Washington county, about 6 miles southeast of Fort Edward, the nearest railroad station. No sewer system is provided in the village, the houses being served by privies, cesspools, etc.

The water supply is obtained from Summit lake, a small body of water located about 2 miles southeast of the village. From the lake the water flows by gravity to a distribution reservoir near the village from whence it is distributed by gravity to the consumers. No purification is provided. The supply is owned by the municipality and was first put into operation in 1914. About 25 per cent of the population are now served with the water, there being in all 39 service taps, none of which are metered. The pressure in the village is about 75 pounds per square inch. There are in all about 3½ miles of mains ranging in size from 4 inches to 6 inches in diameter. Since no meters nor other methods of measuring the water used are available, no definite information could be obtained regarding the consumption, but based upon a per capita rate of 100 gallons daily the present consumption would be 5,000 or 6,000 gallons per day.

The intake pipe extends 40 to 50 feet into the lake to a point where the depth of the water is 15 or 20 feet. This intake is protected by a screen. From the intake the main passes through a tunnel, constructed by the Washington County Alms House and through which a pipe furnishing their supply also passes to the reservoir. The reservoir is constructed of concrete, covered, and is about 30 feet square by 9 feet deep, thus having a capacity of 60,000 gallons. The size of the pipe from the lake to the reservoir is 4 inches and that from the reservoir to the village 6 inches.

The watershed tributary to the lake has an area slightly over 1 square mile and the area of the lake itself about .2 square mile. There are 7 or 8 houses on the watershed which are permanently occupied, thus corresponding to a population of 35 or 40 persons. There are, however, about an equal number of cottages which are occupied during the summer, making the summer population practically double the resident. The watershed is precipitous and is used principally for agricultural purposes. The lake is fed largely by springs, there being no visible inlet except a small stream entering near the outlet.

Two of the farms or permanent residences mentioned above are located on the shores of the lake as are also all of the summer cottages. The following places were observed where it seems quite probable that direct pollution at times finds its way into the water:

1. A summer cottage on the north shore of the lake one-eighth of a mile from the lake, is about 200 feet from the water's edge, the privy, however, is about 250 feet distant.
2. At a farm on the north shore of the lake one-fourth of a mile from the intake, the privy is 180 feet from the water's edge, the pig-pen and barnyard extend to the water and the barn is about 100 feet distant. Considerable garbage was noticed on the edge of the lake at this place.
3. At a group of 5 or 6 summer cottages, located on the south shore of the lake about three-eighths of a mile from the intake, the privies are 25 to 200 feet from the water's edge and are provided with ordinary earth vaults only.
4. At a farm on the south shore of the lake one-half mile from the intake, the barn is about 200 feet from the lake shore and the privy 250 or 300 feet distant.

Due to the number of summer cottages upon the shores of the lake there is undoubtedly more or less bathing in the water and there is also considerable fishing and boating in and on the lake.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but a water that is high in hardness. The figures for nitrogen in the form of albuminoid ammonia and nitrates are high as is also the figure for chlorine, thus indicating that considerable pollution finds its way into the water. The bacterial counts were low, however, and colon bacilli were not found present.

It is impossible, however, to accurately judge the character of the water from a single analysis. In fact it is quite probable that, under different conditions, particularly during the summer when the lake is used extensively by the summer residents, considerable contamination finds its way into the water supply, and it, therefore, cannot be considered safe for potable purposes without purification. While the enforcement of rigid sanitary regulations along the shores of the lake would considerably improve conditions they cannot be depended upon to render the supply entirely satisfactory since there is always danger of accidental, incidental or wilful pollution from the residents and visitors upon the watershed.

As a result of this investigation it may be concluded that the water supply of Argyle is derived from a source which is subject to considerable pollution and the supply in its present state cannot be considered safe for potable purposes.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That careful regulations of the sanitary conditions about the lake shore be at all times maintained and that, should the village encounter any difficulty in maintaining such conditions, application be made to this Department for the enactment of rules and regulations protecting the sanitary quality of the supply.
2. That purification of the supply be provided by the installation of a slow sand filter or other equivalent method.

The slow sand filter recommended above could doubtless be located near the reservoir and it does not seem that the cost, either of construction or operation, would cause any undue burden upon the municipality. In any event some method of purification should be provided in order to render the water satisfactory for potable purposes.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 27, 1917

REPORT OF WATER ANALYSIS FOR ARGYLE

Source	Tap in village	
Collected on	Nov. 5	.....
Color	tr.	.....
Odor, hot	2 v	.....
Odor, cold	2 v	.....
Turbidity	tr.	.....
Solids, total	149	.....
Loss on ignition	32	.....
Mineral residue	117	.....
Ammonia, free	.006	.....
Ammonia, albuminoid	.188	.....
Nitrites	.002	.....
Nitrates	0.56	.....
Oxygen consumed	4.70	.....
Chlorine	1.00	.....
Hardness, total	108.6	.....
Alkalinity	101.0	.....
Bacteria per c.c	35	20
B. coli type 10 c.c.	0+3—	0+3—
B. coli type 1 c.c.	0+3—	0+3—
B. coli type 1/10 c.c.	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4 decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

ARKPORT

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Arkport made by Mr. C. M. Baker, assistant engineer, on September 10, 1917.

Arkport is an incorporated village of 538 inhabitants, located in the western part of Steuben county on the Buffalo Division of the Erie railroad, and the Pittsburg, Shawmut and Northern Railroad, about 5 miles northwest of Hornell. It is in the valley of Canisteo river. No sewer system is provided, the houses being served by privies, cesspools, etc.

The supply is owned by the municipality and controlled by the board of trustees. It was first put into operation in 1914 and is derived from Lime Kiln creek, at a point about one-half mile northeast of the village. From the intake the water flows to a storage and distributing reservoir, thence by gravity to the distributing system. About 80 per cent of the population of the village is supplied with the water, there being in all about 100 service taps, only 1 or 2 of which are metered. The distribution system consists of about 2½ miles of mains ranging from 4 to 6 inches in diameter. Due to the lack of meters or other methods of measuring the water used, no definite information could be obtained regarding the consumption. The pressure in the village averages about 55 pounds per square inch.

At the intake a small reservoir is formed by the construction of a concrete dam, 35 feet long and 2 to 5 feet high across the stream. At the side of the reservoir thus formed, is a concrete intake basin into which there is an opening from the stream protected by a quarter-inch mesh screen. Near the upper end of the reservoir is a second dam constructed of logs to prevent the lower part from filling with stones, gravel, etc. From the intake the water flows by gravity to the storage and distributing reservoir located nearby. This reservoir is an uncovered concrete basin, 70 feet in diameter by 10 feet deep and has a capacity of about 300,000 gallons.

The watershed tributary to the supply is 4 or 5 square miles in area and has a total population of about 20 persons equivalent to 4 or 5 per square

mile. The area consists of a narrow valley formed by hills 300 or 400 feet high. The sides of the hills are very steep. A large portion of the watershed, probably 75 per cent, and particularly that portion in the immediate vicinity of the stream, is heavily wooded. The soil is mostly gravel.

There are 5 occupied and 3 unoccupied houses on the watershed and it is probable that 2 of the latter will never be occupied again. One of the occupied houses about 2 miles above the intake is located at the top of a steep bank draining toward the stream, about 300 feet distant. The privy was formerly located at the top of this bank but has now been moved so that there is little danger of direct pollution from this source. A second house about one-half mile above the intake is located about 250 feet from the stream at the top of a steep bank. The topography is such, however, that the drainage from the vicinity of the buildings is probably away from the stream. The remainder of the houses on the watershed are located from one-eighth to one-quarter mile back from the stream and there appears to be little opportunity for direct pollution from them.

Rules and regulations for the protection of the sanitary quality of the supply were enacted by this Department in 1915 and may be found on page 744, volume 2 of the 36th Annual Report. While rigid enforcement of these rules will probably prevent direct pollution of the supply under normal conditions there is always considerable danger of accidental, incidental or wilful pollution from the inhabitants on the watershed and visitors thereto, which might, under certain conditions, cause infection of the supply.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity at the time the samples were collected, but a water high in hardness. It is possible, however, that the water is at times turbid since the period of detention in the reservoir is probably insufficient to completely remove the turbidity at times of high water. The figures for nitrogen in its various forms are moderate but those for chlorine are somewhat above normal. The bacterial counts are moderate for a surface supply but colon bacilli are found present in 10 c.c. inoculations thus indicating some active contamination.

As a result of this investigation it may be concluded that although the public water supply of Arkport is derived from a source free from direct sources of pollution, it is subject to accidental, incidental or wilful pollution from inhabitants on the watershed tributary to the supply.

In view of the above I beg to offer the following recommendations to be acted upon by the village officials:

1. That consideration be given to the installation of a purification plant consisting of filters and supplementary sterilization with liquid chlorine.
2. That, however, in order to render the supply safe at all times for potable purposes, pending the installation of a complete purification plant, apparatus be provided and the water be sterilized with liquid chlorine.

While sterilization of the water with liquid chlorine will not improve its physical qualities, it will, provided the apparatus is properly operated, render the supply safe for potable purposes. Apparatus for this purpose could be installed and operated at a nominal cost.

Finally I would recommend that copies of this report be sent to the various local officials and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 28, 1917

REPORT OF WATER ANALYSIS FOR ARKPORT

Source	Tap, public supply	Tap, public supply	Tap, public supply
Collected on	3/12/17	9/24/17*	9/24/17*
Color	2.0	0	.....
Odor, hot	1 v	1 v	.....
Odor, cold	1 v	0	.....
Turbidity	cl.	0	.....
Solids, total	140.0	.....	.....
Loss on ignition	12.0	.....	.....
Mineral residue	128.0	.....	.....
Ammonia, free	.020	.004	.....
Ammonia, albuminoid	.028	.140	.....
Nitrites	tr.	0	.....
Nitrates	0.50	0.20	.....
Oxygen consumed	0.50	1.3	.....
Chlorine	2.25	1.75	.....
Hardness, total	158.6	128.6	.....
Alkalinity	115.0	126.0	.....
Bacteria per c.c.	240	Liquified	130
B. coli type, 10 c.c.	2+1—	1+2—	3+0—
B. coli type, 1 c.c.	0+3—	0+3—	0+3—
B. coli type, 1/10 c.c.	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

* Samples 3 days in transit.

ARKVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon a reinspection of the public water supply of the village of Arkville, Delaware county, made on August 6, 1917, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Mr. H. E. Ganung, superintendent, and Dr. Charles S. Allaben, health officer.

General information

Location.— In the eastern part of Delaware county on the east branch of the Delaware river and on the Ulster and Delaware railroad and the Delaware and Northern railroad.

Population.— Population is estimated to be about 350 of which about 300 are served by the public water supply.

The waterworks owned by.— The Arkville Water Company, Mr. Henry M. Cowan, president.

Consumption.— Estimated at 30,000 gallons per day.

Source of supply.— Small mountain brook, intake being about 1 mile southeast of the village.

Distribution system.— Gravity supply. About 2 miles of water mains from 4 inches to 6 inches in diameter.

Service taps.— 37, none of which are metered; 10 hydrants.

Pressure.— 60 pounds per square inch.

A previous inspection of this supply was made in 1908, a copy of the report being found on page 320, volume 2 of the 1908 Annual Report of the New York State Department of Health.

In general the supply is practically the same as described in the former report. The reservoir is cleaned out twice a year and after each rainstorm the street mains are flushed to remove the turbid water.

The watershed above the intake is about .55 of a square mile. There are

no houses upon the watershed and the only pollution ordinarily received would be from persons or animals passing over the watershed.

At the time of the inspection a sample of the water supply was collected from a tap in the village and the analyses of this sample will be found in the appended table.

From the analyses of this sample it will be seen that at the time of the inspection the water was clear, free from color and quite soft. The figures for nitrogen in its various forms are comparatively low and chlorine is about normal for this part of the State. The bacterial count was fairly high for a mountain stream and organisms of the B. coli group were found in one of the 10 c.c. samples inoculated. This shows the presence of a small amount of pollution, due probably to animals upon the watershed.

From the results of this investigation and of the analyses it may be concluded that at the time of the inspection the public water supply of the village of Arkville was apparently of a reasonably satisfactory sanitary quality.

In view of this conclusion I would make no recommendation other than that every effort be made by the water company to maintain the supply, the intake and the watershed in a satisfactory sanitary condition in order that the supply may at all times be free from contamination.

I would also recommend that copies of this report be sent to the Arkville Water Company and to the local authorities.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 27, 1917

REPORT OF WATER ANALYSIS FOR ARKVILLE

Source		Tap in village, marked "A"
Collected on		8/6/17
Color		0
Odor, hot		1 v.
Odor, cold		1 v.
Turbidity		0
Solids, total		.....
Loss on ignition		.....
Mineral residue		.....
Ammonia, free		.004
Ammonia, albuminoid		.018
Nitrites		Absent
Nitrates		.24
Oxygen consumed		.3
Chlorine		1.00
Hardness, total		19.5
Alkalinity		16.0
Bacteria per c.c.		750
B. coli type	10 c.c.	1+2—
	1 c.c.	0+3—
	1/10 c.c.	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

BALLSTON SPA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Ballston Spa, made by Mr. C. M. Baker. assistant engineer, on July 16, 1917.

Ballston Spa is an incorporated village of 4,344 inhabitants located in Saratoga county on the D. & H. railroad, 32 miles northwest of Albany, and on Kayaderosseras creek. The village is provided with a sewer system and a disposal plant consisting of septic tanks and contact beds, the effluent from which discharges into the creek.

The public water supply is derived from 3 impounding reservoirs fed by springs located ¼, 1½ and 3 miles respectively north of the village. The first, known as the Parmeton reservoir, was put into service in 1867 or 1868, the Round Hollow reservoir in 1871 and the Burdette reservoir in 1900. The waterworks are owned and operated by the village under the direction of the board of trustees.

Practically all of the village is served with the water, there being in all between 900 and 1,000 service taps, only a few of which are metered. The total consumption averages about 550,000 gallons per day, which is equivalent to 127 gallons per capita. The pressure in the village ranges from 45 to 85 pounds per square inch depending upon the topography.

The pumping equipment is housed in a brick building located in the northern edge of the village and consists of a General Electric induction motor which operates a Rumsey 10-inch by 12-inch pump having a capacity of 500 gallons per minute, also a 22 horsepower Fairbanks-Morse gasoline engine that operates an 8-inch by 10-inch Rumsey triplex double-acting pump. The reservoirs are all at about the same elevation and are directly connected with the suction lines of the pumps which forces the water, either directly into the reservoir, or through the distribution system, the excess flowing into the reservoir. The capacity of the Parmeton reservoir is 3,000,000 gallons, of the Burdette reservoir, 6,000,000 and of the Round Hollow reservoir 5,000,000 gallons.

The Parmeton spring and reservoir as stated above are located about one-fourth of a mile north of the village. The spring is at the foot of a steep slope and flows into the reservoir located just below, this reservoir being formed by an earthen dam across a ravine. Two and a half or three acres of land about the spring and reservoir are owned by the village and enclosed by a fence. No signs regarding trespassing were posted, however, and boys were fishing in the reservoir at the time of the inspection. A road passes near the upper edge of the ravine in which the spring is located and just beyond the road, about 200 feet from the spring, is a farm house provided with a privy of the ordinary rural type. It seems possible that under certain conditions the ground water tributary to the spring might become polluted from this source. Furthermore, a path leads down to the spring from the house and it is said that the occupants of the house obtain water directly from the spring.

The Burdette reservoir and springs are located about 1½ miles north of the village. In this district the village owns about 300 acres of land. Although there are two farms located on the watershed, these probably do not affect the sanitary quality of the supply as they are located well back from the streams and the land is practically level. In the reservoir there was considerable growth of chara although it was apparent that the growth was comparatively young and had been only recently formed. At certain times during the summer considerable trouble has been experienced due to tastes and odors in the water and it is possible that this plant is the cause of the trouble although it may be that other algae growths not present at this time occasionally affect the supply. No attempt has been made to eliminate the trouble.

Round Hollow reservoir and springs are located about 3½ miles north of the village. The springs are in a ravine the reservoir being about one-quarter of a mile below and formed by the construction of a dam across the ravine.

Although the village owns 6 or 7 acres of land in this section the area is not fenced. There are, however, no inhabitants in the vicinity.

The various springs which constitute the source of the supply are located at the eastern edge of a large level sandy plot which undoubtedly constitutes the collecting area tributary to the supply. This territory is only sparsely settled and there appears to be little possibility of direct contamination of these sources except that from the Parmeton reservoir which, due to its proximity to the village, and to the farm located nearby, may at times receive pollution from the farm privy and also from trespassers in the vicinity of the reservoir. While it is possible that by posting notices and enforcing rigid regulations, also by proper sanitary regulations on the premises located nearby, this supply may be protected from pollution, it seems that it would be more satisfactory to abandon this source of supply providing the other two sources furnish sufficient water.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with these of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity, also a water low in hardness. The figures for nitrogen in its various forms are low and the figures for chlorine are moderate. The bacterial counts are at times high, however, and colon bacilli are prevalent in 10 c.c. inoculations and occasionally present in 1 and 1/10 c.c. inoculations, thus indicating the presence of active and potentially dangerous contamination.

As a result of this investigation it may be concluded:

1. That the public water supply of Ballston Spa is subject to pollution:
   (a) By trespassers in the vicinity of the Parmeton reservoir and also by a privy located near this reservoir.
   (b) By trespassers in the vicinity of the other two reservoirs.
2. That some trouble has been experienced in the past due to tastes and odors in the water due to algae growth.

In view of the above I beg to offer the following recommendations to be acted upon by the village authorities:

1. That if sufficient water can be obtained without the use of the Parmeton reservoir this source of supply be abandoned. If, however, it is necessary to continue the use of this supply it is recommended that:
   (a) Watertight containers be provided for the privy on the premises located nearby and that these containers be emptied and contents properly disposed of at regular intervals.
   (b) Suitable notices be posted and rigid regulations enacted to prevent trespassing about the reservoir.
   (c) Suitable drainage ditches be constructed to divert all surface wash.
2. That with respect to the Burdette reservoir and the Round Hollow reservoir the areas owned by the village be fenced and proper notices posted to prevent trespassing.
3. That regular and frequent inspections be made of the watersheds tributary to the supplies in order to locate and eliminate any insanitary conditions which may be found to exist.
4. That should any trouble be experienced in properly regulating the sanitary conditions on the watersheds tributary to the Ballston Spa water supply, application be made to this Department for the enactment of rules and regulations protecting the sanitary quality of the supply.

I would further recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 27, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT —=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Ballston Spa	Saratoga	Tap, public supply	2/ 7/11	Tr.	Cl.			43		28	.018	.038	.001	0.04	0.90	1.75	27.3	26.0	30	—	—	—
Ballston Spa	Saratoga	Tap, public supply	4/27/11	5	Tr.			32		25	.012	.054	.001	0.06	0.30	1.20	22.1	20.0	40	+	—	—
Ballston Spa	Saratoga	Tap ,public supply	7/ 6/11	10	5			70		54	.006	.026	.002	0.10	0.40	0.75	26.0	22.0	100	+	—	—
Ballston Spa	Saratoga	Reservoir	7/12/11	25	5						.010	.116	.005	0.10	2.10	2.50	31.2	23.0	400	+	—	—
Ballston Spa	Saratoga	Tap, public supply	8/31/11	5	Tr.			41		27	.016	.084	.002	0.04	1.00	0.75	24.7	24.0	500	+	+	—
Ballston Spa	Saratoga	Crook brook, proposed source.	9/12/11	15	Cl.			110		90	.004	.010	.001	0.04	5.50	1.50	74.3	70.0	69,000	+	+	+
Ballston Spa	Saratoga	Tap, public supply	10/ 6/11	Tr.	Cl.			53		33	.014	.032	.002	0.04	0.20	0.50	26.0	24.0	400	+	—	—
Ballston Spa	Saratoga	Tap, public supply	12/13/11	Tr.	Cl.			80		65	.010	.026	.003	0.10	0.23	0.75	26.0	25.0	110	—	—	—
Ballston Spa	Saratoga	Tap, public supply	1/17/12	Tr.	Cl.			61		56	.006	.006	Tr.	0.16	0.40	0.75	27.3	27.0	40	+	—	—
Ballston Spa	Saratoga	Tap public supply	2/ 8/12	Tr.	Cl.			45		33	.010	.018	Tr.	0.16	0.40	0.75	26.0	25.0	80	+	—	—
Ballston Spa	Saratoga	Tap, public supply	3/14/12	5	Tr.			37		37	.040	.038	Tr.	0.20	1.30	0.50	24.7	23.0	50	+	—	—
Ballston Spa	Saratoga	Tap, public supply	4/24/12																30	+	—	—
Ballston Spa	Saratoga	Tap, public supply	7/23/12	7	5			50		32	.010	.050	.001	0.06	1.20	0.25	27.3	26.0	850	+	+	—
Ballston Spa	Saratoga	Tap, public supply	9/20/12	10	Cl.			44		30	.004	.026	.001	0.08	1.20	0.37	26.0	20.0	85	+	—	—
Ballston Spa	Saratoga	Tap, public supply	11/ 4/12	5	Cl.			47		38	.012	.076	.001	0.02	1.50	0.50	29.9	24.0	80	—	—	—
Ballston Spa	Saratoga	Tap, public supply	1/18/13	5	Cl.			42			.012	.038	.001	0.20	1.00	0.87	19.5	18.0	40	—	—	—
Ballston Spa	Saratoga	Tap, public supply	3/ 7/13	Tr.	Cl.			49			.010	.040	Tr.	0.08	0.80	1.25	31.2	21.0	60	—	—	—
Ballston Spa	Saratoga	Tap, public supply	4/24/13	2	Cl.			46			.010	.030	Tr.	0.02	0.90	0.25	19.5	19.0	80	—	—	—
Ballston Spa	Saratoga	Tap, public supply	6/27/13	7	2			51			.004	.060	.001	0.04	0.90	0.75	23.4	23.0	20	+	—	—
Ballston Spa	Saratoga	Tap, public supply	4/ 9/14	5	5			42		27	.032	.058	.001	0.06	1.70	0.75	20.8	20.0	150	—	—	—
Ballston Spa	Saratoga	Tap, public supply	10/15/14	5	Tr.			43		29	.008	.030	001	Tr.	1.00	0.75	27.3	24.0	375	—	—	—
Ballston Spa	Saratoga	Parmeton spring; public supply	8/16/17																70	3+0—	2+1—	0+3—
Ballston Spa	Saratoga	Burdette spring; public supply	8/16/17																650	3+0—	2+1—	0+3—
Ballston Spa	Saratoga	Round Hollow spring; public supply	8/16/17																100	3+0—	1+2—	0+3—
Ballston Spa	Saratoga	Tap, public supply	8/16/17	0	0						.008	.076	Tr.	0.02	0.90	1.75	27.3	26.0	90	1+2—	0+3—	0+3—

BARKER

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of the village of Barker, made on January 12, 1917, by Mr. E. S. Chase, assistant engineer in this Department.

Barker is an incorporated village with a population of 550 located in the northeastern part of Niagara county on the Rome, Watertown and Ogdensburg Division of the New York Central railroad about midway between the cities of Buffalo and Rochester. There is no public system of sewers, the village being served by privies, cesspools, etc.

The public water supply is derived from Lake Ontario after filtration through a slow sand filter. The waterworks are owned and operated by the municipality under the direction of the board of trustees of which Mr. G. E. Landy is president and Mr. J. R. Spafford is superintendent. The waterworks were constructed in 1915 and were first put into operation in November of that year. The waterworks system was designed by Mr. C. C. Hopkins, civil engineer of Rochester, and constructed by contract under his direction.

From the purification plant, located on the shore of Lake Ontario 3 miles north of the village, the water is pumped through about 6 miles of water mains against an average pressure of about 47 pounds per square inch maintained by a standpipe located in the northern part of the village. At the time of the inspection there were 85 service taps, all of which were metered. The daily water consumption is about 10,000 gallons.

The intake extends 100 feet into the lake to a point where the water is about 10 feet deep. This intake pipe ends in a bar strainer raised about 1 foot above the bottom of the lake. From the intake pipe the water is pumped by a low lift centrifugal pump to the slow sand filter. The walls of this filter are concrete and the whole is covered by a wooden floor. Water is maintained at a depth of 3½ feet over the sand by means of an automatic device which starts and closes the low lift centrifugal pump within the limits of about 6 inches. The filter is divided into two units each 29½ feet by 25 feet in plan and containing 2 feet of sand over 1 foot of graded gravel underdrained by a collecting system of one-half round tile. The filter is said to require cleaning about every two months, the necessity for cleaning being indicated by the inability to secure a sufficient amount of water from the filters. From one-quarter inch to one-half inch of the top sand is removed at each cleaning and about 3 inches in all are removed before new sand is replaced. From the filter the water flows to a concrete clear water well constructed of concrete and covered by a conical wooden roof. This clear well is 32½ feet in diameter and 8 feet deep and has a capacity of 50,000 gallons.

From the clear water basin the water is pumped by a Deane triplex pump 7 inches by 8 inches geared to a 20-horse power General Electric motor. This pumping equipment is provided in duplicate. The standpipe is constructed of steel and is 14 feet in diameter by 100 feet high and has a capacity of 115,000 gallons.

The sanitary quality of the water derived from Lake Ontario is open to suspicion. The intake is about 25 miles east of the mouth of the Niagara river which carries large amounts of sewage from the cities of Buffalo, the Tonawandas and Niagara Falls and other municipalities. Furthermore, the water of the lake near the shore is subject to contamination by surface wash from cultivated lands.

At the time of the inspection samples of the raw and treated water were collected and the results of the analyses of these samples together with previous ones made by the Division of Laboratories and Research are recorded in the appended table.

These analyses show that the purification plant is effective in removing turbidity and in bringing about an improvement of the sanitary quality of the supply as indicated by the reduction in bacterial counts and in organisms of the B. coli type. A sample of the filtered water collected at the time of

the inspection shows rather high total counts and the presence of B. coli in one of the three 10 c.c inoculations. This sample was taken at a time of year when slow sand filters are the least efficient, and indicates the possible desirability of supplementing the filter by some means of sterilization through the use of liquid chlorine or other effective method.

In view of the above the following conclusions may be drawn:

1. That Lake Ontario at the intake of the Barker public water supply is subject to contamination from shore wash and probably to some extent by the sewage discharged into it through the Niagara river.
2. That the purification plant appears to be so designed and operated as to afford a reasonable degree of purification of the water although a more complete safeguard would be obtained should supplementary sterilization be adopted.

I would, therefore, recommend:

1. That the village authorities continue to operate the purification plant with constant care.
2. That the village give careful consideration to the installation of some form of sterilization apparatus for secondary treatment of the filtered water.

In conclusion, I would recommend that a copy of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 16, 1917

REPORT OF WATER ANALYSIS FOR BARKER

Source	Filtered water	Raw water	Filtered water
Collected on	8/1/16	1/12/17	1/12/17
Color	5	5	5
Odor, hot	2 a	1 v.	1 v.
Odor, cold	2 a	1 v.	1 v.
Turbidity	Cl.	20	Cl.
Solids, total	154	262	.....
Loss on ignition	35	32	.....
Mineral residue	119	230	.....
Ammonia, free	.002	.040	.008
Ammonia, albuminoid	.035	.126	.072
Nitrites	.002	.003	Tr.
Nitrates	0.14	0.16	0.10
Oxygen consumed	1.80	1.00	2.10
Chlorine	8.25	10.0	10.25
Hardness, total	102.8	128.6	137.2
Alkalinity	100.0	108.0	114.0
Bacteria per c.c	10	6,600	450
B. coli type 10 c.c.	—	3+0—	1+2—
B. coli type 1 c.c.	—	3+0—	0+3—
B. coli type 1/10 c.c.	—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

BATH

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Bath made by Mr. C. M. Baker, assistant engineer, on September 4, 1917.

Bath is an incorporated village of 4,176 inhabitants, located in Steuben county on the D., L. & W. railroad and the Rochester Branch of the Erie railroad about 60 miles south of Rochester. It is on the Cohocton river. A private system of sewers serves the county buildings and some others in this vicinity and discharges without purification into the river. The remainder of the village is served by privies, cesspools, etc.

The water supply is owned and operated by the Bath Waterworks Company of which Mr. Robert E. Kizer is president and Mr. Kleckler superintendent. The supply was installed and first put into operation in 1887, since when the only changes have consisted in improvements in the pumping machinery and in extensions to the distribution system. The supply is derived from a well, located immediately west of the village, from which water is pumped through the distribution system into a standpipe located on a hill about one-half mile southwest of the village.

There are in all some 8 miles of mains ranging in size from 4 inches to 10 inches in diameter. About 50 per cent of the population of the village is served with water, there being in all some 600 service taps, 60 per cent of which are metered. The consumption ranges from 200,000 to 300,000 gallons daily and averages approximately 225,000 gallons per day, equivalent to per capita rates of 96,143 and 107 gallons respectively. The pressure in the village with a full reservoir is approximately 87 pounds per square inch.

The pumping equipment is housed in a brick building located near the well and consists of one Blake Duplex pump with a capacity of 1,000,000 gallons daily, one Gould triplex single-acting pump, 8 inches by 10 inches, capacity about 600,000 gallons per day and one triplex Deane double-acting 5 inches by 8 inches with a capacity of 240,000 gallons per day. The Blake pump is operated by steam from a 75-horse power boiler, while the other pumps are operated by a 35-horse power producer gas engine. The standpipe is 38 feet in diameter by 40 feet high and has a capacity of approximately 300,000 gallons. It is uncovered. Due to the small amount of sediment in the water, it is unnecessary to clean the standpipe except at infrequent intervals, the last cleaning having been made five or six years ago. The hydrants in the distribution system are flushed occasionally.

The well from which the supply is derived is located near a small pond just west of the village. It is 20 feet in diameter by 28 feet deep, is curbed with a steel casing which extends about 1 foot above the surface and is covered with a wooden roof. The water bearing stratum from which the supply is obtained consists of a gravel formation overlaid by a hardpan or cement gravel. Over this stratum is gravel and loam to the surface. The well appears to be adequately protected from surface wash. A barn is located about 200 feet from the well and a house and cesspool at a distance of about 300 feet. These buildings are so located, however, that the flow of ground water is probably from the well toward the buildings and the topography of the surface is such that surface water cannot find its way from these buildings toward the well.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but a water that is high in hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low but those for nitrates and chlorine appear to be somewhat above normal. The bacterial counts are at times high for a well water but

this may be due in part, at least, to delays in transit, since three days elapsed from the time of collecting the recent samples until they were received at the laboratory. Organisms of the B. coli type have been found in 10 c.c. inoculations in the case of 3 only among some 16 samples analyzed during the past six years. This moderate prevalence of B. coli is of little sanitary significance.

As a result of this investigation it may be concluded that the public water supply of Bath was in satisfactory sanitary condition at the time of the inspection. It seems only necessary to recommend at this time, therefore, that the water company continue to exercise their present supervision in order that the water may at all times be properly protected from contamination.

Finally I would recommend that copies of this report be sent to the local health officer, to the water company and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 20, 1917

Results of Water Analyses

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	Physical				Chemical (Parts Per Million)											Bacteriological			
				Color	Turbidity	Odor		Solids			Nitrogen as—				Oxygen consumed	Chlorine	Hardness		Bacteria per c.c.; gelatin 20°, 48 hours	B. Coli Type + = present — = absent		
						Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates			Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
Bath	Steuben	Tap, public supply	1/ 8/12	Tr.	Cl.			199	....	176	.004	.006	Tr.	1.08	0.20	4.25	162.8	154.0	70	—	—	—
Bath	Steuben	Tap, public supply	2/14/12	Tr.	Cl.			214	....	164	.014	.020	Tr.	0.52	0.40	4.25	171.4	166.0	170	—	—	—
Bath	Steuben	Tap, public supply	3/22/12	Tr.	Cl.			191	....	167	.022	.036	Tr.	0.90	0.50	4.50	165.8	163.0	3,500	+	—	—
Bath	Steuben	Tap, public supply	10/ 5/12	Tr.	Cl.			226	....	214	.003	.012	.001	0.60	0.70	3.75	208.0	181.0	20	—	—	—
Bath	Steuben	Tap, public supply	10/19/12	Tr.	Cl.			252	....	211	.004	.042	Tr.	1.00	0.60	4.00	194.2	174.0	2,500	—	—	—
Bath	Steuben	Tap, public supply	11/18/12	Tr.	Cl.			228	....	191	.010	.042	Tr.	0.90	0.80	4.25	180.0	175.0	30	—	—	—
Bath	Steuben	Tap, public supply	11/25/12	Tr.	Cl.			229	....	194	.004	.014	Tr.	0.92	0.10	4.25	174.2	172.0	200	+	—	—
Bath	Steuben	Tap, public supply	1/ 2/13	Tr.	Cl.			193	....	....	.014	.032	Tr.	1.00	0.60	3.75	160.0	146.0	210	—	—	—
Bath	Steuben	Tap, public supply	3/12/13	Tr.	Tr.			232	....	....	.008	.030	.001	1.00	0.80	4.00	157.2	157.0	30	—	—	—
Bath	Steuben	Tap, public supply	5/ 3/13	Tr.	Cl.			240	....	....	.010	.013	Tr.	1.20	0.10	5.25	182.8	149.0	700	—	—	—
Bath	Steuben	Tap, public supply	6/10/13	Tr.	Tr.			223	....	....	.004	.020	Tr.	0.90	0.30	5.00	163.6	163.0	180	—	—	—
Bath	Steuben	Tap public supply	7/26/13	Tr.	Tr.			274	....	....	.028	.012	Tr.	0.80	0.40	5.75	182.8	175.0	1,500	—	—	—
Bath	Steuben	Tap, public supply	12/10/13	Tr.	Cl.			220	....	203	.004	.008	.002	0.80	0.80	4.13	197.2	157.0	190	—	—	—
Bath	Steuben	Tap, public supply	12/26/16	Tr.	Cl.			....	....	....	.014	.092	.001	0.76	1.20	6.50	221.5	185.0	375	1+2—	0+3—	0+3—
Bath	Steuben	*Tap at pumping station	9/30/17	0	0	0	0	....	....	....	.002	.008	0	1.00	0.10	6.75	201.5	194.0	425	0+3—	0+3—	0+3—
Bath	Steuben	*Tap in village	9/30/17	0	0	0	0	....	....	....	.002	.002	0	1.00	0.10	6.75	201.5	194.0	190	0+3—	0+3—	0+3—

* Samples two days in transit.

BEDFORD HILLS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Bedford Hills made on December 22, 1916, by Mr. M. F. Sanborn, assistant engineer in this Department, who was assisted by Mr. C. E. Burbank, superintendent of the water company.

Bedford Hills is an unincorporated village with a population of 1,200 located in the town of Bedford in the northcentral part of Westchester county on the Harlem Division of the New Cork Central railroad about 33 miles north of New York City. The village is not provided with a sewer system, the houses being served by cesspools, septic tanks and privies.

The water supply is obtained from several springs on a hillside in the southern part of the village and an auxiliary supply is obtained from a drilled well in the northern part of the village. The water supply is owned and operated by the Bedford Hills Water Company which constructed the waterworks in 1906.

About 420 or 35 per cent of the population are served by the supply with an average daily consumption of 42,000 gallons. The water mains consist of 2 miles of 2-inch pipe. Of the 60 service taps none are metered. From the springs the supply is distributed by gravity and from the well by pumping. The average pressure is approximately 80 pounds per square inch at the railroad station. In addition to a distributing reservoir there are two cisterns for fire protection which are connected with the distribution system. The reservoir, located near the springs, is 17 feet in diameter and 12 feet deep. It is constructed of stone masonry, with a concrete cover and has a capacity of 20,000 gallons. The auxiliary well in the northern part of the village is drilled to a depth of 300 feet, passing through 20 feet of earth, and the remainder of the distance through rock. The casing is 6 inches in diameter.

The springs from which the supply is mainly obtained are protected by stone masonry basins and are reasonably well protected from surface wash. The auxiliary well is rather unsatisfactorily located with respect to possibilities of pollution of tributary ground water. The pumping station is located in the rear of the house of the pump operator. There is a cesspool for this house about 30 feet distant from the well. A privy is located within 100 feet of the well and three others are between 100 and 200 feet distant. The railroad passes between the cesspool serving the house at the pumping station and lower land on which a new cesspool might be located. By securing permission to cross the railroad tracks with a sewer line it would be possible to construct a cesspool remote from the auxiliary well.

Samples of water were collected at the time of the inspection and the results of the analyses of these samples will be found in the appended table.

The results of the analyses of the regular supply show a water clear, colorless and moderately hard. With the exception of that for nitrates the figures for nitrogen in its various forms are low, indicating the presence of moderate amounts only of decomposing or decomposable organic matter. The figures for nitrates, however, are somewhat high, indicating the occurrence of organic pollution of tributary ground water, rendered inactive, however, by natural processes of purification. The total bacterial counts are low and organisms of the B. coli type were not isolated from inoculations tested. The single bacterial analysis of the auxiliary well supply indicated the absence of active contamination at the time of the collection of the samples.

In the case of the well supply, however, it is impossible to predict the contamination of its freedom from active contamination at times of excessive draft or other unusual hydraulic conditions of the ground water. In view of the numerous opportunities for pollution located nearby it seems somewhat doubtful whether satisfactory results would at all times be obtained.

In view of the above facts the following conclusions may be drawn:

1. That the springs serving as the principal source for the public water supply of Bedford Hills, if properly developed and maintained, should afford a reasonably satisfactory supply for the village.

2. That the auxiliary well, however, is unsatisfactorily located with respect to nearby sources of pollution.

I would, therefore, recommend:

1. That the Bedford Hills Water Company take steps to place the various springs tributary to their water supply in a satisfactory condition and to so maintain them that they will at all times be free from possibilities of pollution by surface wash.

2. That the cesspool in the vicinity of the auxiliary well be abandoned and another cesspool constructed on the opposite side of the railroad track at least 200 feet distant from the well and that all privies within a radius of 500 feet on the well be provided with watertight removable containers which shall be maintained in a satisfactory condition at all times, the contents of which being removed and disposed of at some satisfactory place as frequently as may be found necessary.

3. That whenever, the auxiliary supply is used analyses be made at regular intervals to determine whether it remains free from active contamination and should such contamination be at any time found present that steps be taken to discover and eliminate the source, or if such be found impossible or impracticable, steps be taken to sterilize the supply with liquid chlorine.

I would further recommend that copies of this report be transmitted to the Bedford Hills Water Company, to the local health officer, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July* 27, 1917

REPORT OF WATER ANALYSIS FOR BEDFORD HILLS

Source		Tap near	Overflow at	Well supply
Collected on		12/27/16	12/27/16	12/27/16
Color		Tr.	.....	.....
Odor, hot		1 v.	.....	.....
Odor, cold		1 v.	.....	.....
Turbidity		Tr.	.....	.....
Solids, total		150	.....	.....
Loss on ignition		25	.....	.....
Mineral residue		125	.....	.....
Ammonia, free		.012	.....	.....
Ammonia, albuminoid		.038	.....	.....
Nitrites		.001	.....	.....
Nitrates		1.60	.....	.....
Oxygen consumed		0.30	.....	.....
Chlorine		7.50	.....	.....
Hardness, total		81.4	.....	.....
Alkalinity		76	.....	.....
Bacteria per c.c.		25	10	10
B. coli type	10 c.c.	0+3—	0+3—	0+3—
	1 c.c.	0+3—	0+3—	0+3—
	1/10 c.c.	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent:
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

BELFAST

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Belfast made by Mr. C. M. Baker, assistant engineer, on July 13, 1917.

Belfast is an unincorporated village of between 500 and 600 inhabitants, located in the town of the same name, Allegany county. It is on the Rochester branch of the Pennsylvania railroad, 79 miles south of the city of Rochester. No sewerage system is provided in the village, the houses being served by privies, cesspools, etc.

The public water supply is derived from wells located on a hill about one mile west of the village and was first put into service about 1907 or 1908. The waterworks are owned by the village and are operated under the direction of the board of water commissioners. Since the original installation, 4 new wells have been added to the system. About one-half the population of the village is served with water, there being in all 160 service taps all of which are metered. The average daily consumption is about 18,000 gallons with a maximum of 25,000 and a minimum of 11,000. A milk station and canning factory in the village use considerable water during certain seasons of the year. There are in all about 3 miles of water mains ranging in size from 4 to 6 inches in diameter. The pressure is about 60 pounds per square inch in the central part of the village.

The water is raised by an air lift from the wells into a concrete reservoir located nearby from which it flows by gravity to the village and through the distribution system. The wells, nine in number, are 8 inches in diameter, and with the exception of one, which is 328 feet deep, are drilled to a depth of about 350 feet. The wells pass first through 6 to 12 feet of soil, including loam and gravel and then for the remainder of the distance through shale. Water rises in the wells to within about 30 feet of the top. Harris air lifts are used to force the water from the wells directly into the reservoir. The pumping station is constructed of brick and is equipped with two Blaisdale air compressors each of which is operated by a 33-horse power gas or gasoline engine. The reservoir is constructed of concrete and provided with a concrete cover. It is 30 by 60 feet in plan by 10½ feet deep and has a capacity of 236,000 gallons. The air compressors are operated as necessary; usually three or three and one-half hours per day.

The wells are located in a hillside pasture and an area of approximately 1½ acres about them is owned by the village and enclosed by a fence. The nearest buildings consist of farm buildings which are about 600 feet distant. No insanitary conditions were observed in the vicinity and it would seem that a satisfactory supply of water should be obtained from the wells.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended tables.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but a water that is very hard. The figures for nitrogen in its various forms are low. Those for chlorine although high are probably due to mineral deposits. The bacterial counts are occasionally high but these may be due to delays in transit, two days frequently elapsing from the time of collection until the samples were received at the laboratory. Colon bacilli are usually absent, although on two occasions these organisms have been found present in 10 c.c. inoculations, thus indicating the presence of a small amount of active contamination. It is probable however, that this contamination was due to some local condition not generally affecting the supply.

As a result of this investigation it may be concluded that the public water supply of Belfast is derived from a source which should furnish a water of satisfactory sanitary quality, but one that is very hard.

In view of the above it seems necessary to recommend at this time only that the village authorities continue their careful supervision of the supply in order to properly protect it at all times from contamination.

I would further recommend that copies of this report be sent to the local officials and to the sanitary supervisor of the district.

Yours very truly,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 28, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Belfast	Allegany	Tap, public supply	4/15/12	Tr.	Cl.	....	....	280	....	265	.004	.031	Tr.	0.14	0.20	10.75	168.6	97.0	1,100	−	−	−
Belfast	Allegany	Tap, public supply	9/26/12	Tr.	Cl.	....	....	301	....	275	.002	.002	Tr.	0.24	0.60	16.50	228.5	.....	600	+	−	−
Belfast	Allegany	Tap, public supply	11/22/12	Tr.	Tr.	....	....	298	....	278	.020	.038	Tr.	0.20	0.70	16.00	214.5	226.0	180	+	−	−
Belfast	Allegany	Tap, public supply	1/13/13	5	Cl.	....	....	274	....	....	.056	.032	Tr.	0.20	2.00	13.75	214.5	206.0	350	+	−	−
Belfast	Allegany	Tap, public supply	4/19/13	Tr.	Cl.	....	....	266	....	....	.030	.024	Tr.	0.24	0.60	11.50	183.5	206.0	30	−	−	−
Belfast	Allegany	Tap, public supply	6/ 7/13	Tr.	Cl.	....	....	272	....	....	.004	.008	Tr	0.10	0.40	13.50	169.0	216.0	130	−	−	−
Belfast	Allegany	Reservoir, public supply	9/17/13	Tr.	Cl.	....	....	....	....	....	....	....	....	....	....	....	....	.....	17,500	−	−	−
Belfast	Allegany	Tap, public supply	7/13/17	0	0	1 v	2 v	190	....	....	.004	.026	0	0.12	1.20	12.25	222.8	218.0	900	−	−	−

BELMONT

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon a reinspection of the public water supply of the village of Belmont, made by Mr. E. S. Chase, assistant engineer, on April 4, 1917.

General information

Location.—Allegany county, on Erie railroad, 34 miles west of Hornell.
Population.— 1,031, 90 per cent of which are served with the water.
Source of supply.— Springs and northern branch of Phillips creek, three quarters of supply from latter source.
Consumption.—Estimated at 100,000 gallons daily.
Distribution system.— Gravity — 6 miles of mains, 4 inches to 6 inches in diameter.
Service taps.—Estimated 200.
Pressure.—75 pounds per square inch.
Storage.—Reservoir for receiving excess over consumption.
Purification.—None.
Reference to previous investigations.— Investigation August 11, 1915, reported upon September 28, 1915. In the previous report on an inspection of this supply it was recommended that sources of direct contamination on the Phillips watershed be removed and, if necessary, applications be made to this Department for the enactment of rules and regulations. It was also recommended that the creek supply be adequately purified and that the spring supplies be more adequately protected from surface contamination or else abandoned. As an alternative, it was suggested that a new supply might be provided by developing additional springs or wells properly located and protected from contamination.

The recent inspection disclosed the fact that the sanitary conditions upon the watershed are substantially the same as at the time of the previous investigation and as recorded in the previous report. At one farm, however, about 1½ miles above the intake, the privy was underdrained by a small watercourse leading directly to the stream. Numerous other opportunities for more or less direct contamination from surface wash from the vicinity of houses, barns, etc., exist.

During the floods of the spring of 1916 a portion of the pipe line was washed out and water was pumped into the main from Angelica creek, a tributary to Phillips creek and with a similar watershed.

Samples of the water were collected at the time of the inspection and the results of these analyses made by the Division of Laboratories and Research are recorded in the appended table.

The physical, chemical and bacterial characteristics of this water have been discussed in the previous report and the recent analyses throw little additional light in this respect. The sample collected at the time of the recent inspection was highly colored, turbid and moderately hard. The total count was somewhat high and organisms of the B. coli type were present indicating the presence of active contamination of animal or human origin.

In view of the above facts the following conclusions may be drawn:

1. That the village authorities have not as yet carried out the recommendations of our previous report.
2. That the need for the recommended improvements still exists.
3. That the problem involved in the development of the best supply for Belmont is one requiring considerable detailed study in order to determine the method most practical and economical. This Department cannot, of course, undertake an extended study of the situation.
4. That a properly designed and operated filter plant upon the north branch of Phillips creek would undoubtedly assure the village of an adequate and satisfactory supply of water provided such a plant were at all times properly operated.

In view of the above facts I would recommend:

1. That the village authorities give their immediate attention to the previous recommendations of this Department.
2. That, unless equally satisfactory results can be obtained by some other means not now apparent, the village install and operate a modern filtration plant for the purification of the supply from the north branch of Phillips creek.
3. That, before deciding upon the expenditure of any sum of money for waterworks improvements, the village retain the services of a competent engineer to study fully into the problem and advise them as to the most feasible method to pursue to obtain a safe and adequate supply.

While it is evident that the carrying out of the above improvements will necessitate considerable expenditure on the part of the village, it is far better to take such steps at this time than to wait until an outbreak of waterborne typhoid fever occurs with resultant economic and social loss.

In conclusion I would recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 24, 1917

REPORT OF WATER ANALYSIS FOR BELMONT

Source		Tap
Collected on		4/4/17
Color		20
Odor, hot		2 v.
Odor, cold		1 v.
Turbidity		8
Solids, total		.....
Loss on ignition		.....
Mineral residue		.....
Ammonia, free		.015
Ammonia, albuminoid		0.6
Nitrites		.001
Nitrates		0.04
Oxygen consumed		3.10
Chlorine		1.75
Hardness, total		95.8
Alkalinity		19.0
Bacteria per c.c.		160
B. coli type	10 c.c.	2+1—
	1 c.c.	0+3—
	1/10 c.c.	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

BERLIN

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon a reinspection of the public water supply of the unincorporated village of Berlin made by Mr. M. F. Sanborn, assistant engineer, on April 12, 1917.

General information

Location.— Rensselaer county, on the Little Hoosic river, about 15 miles east of Troy, on the Rutland railroad.

Population.— 750, 75 per cent of which is served with the water.

Waterworks in charge of.— Berlin Water Co.

Source of supply.— Two brooks and two springs about 1 mile southwest of the village.

Consumption.— 75,000 gallons per day, 25 per cent for industrial purposes.

Distribution system.— Gravity, 2 miles of mains, 1 to 6 inches in diameter.

Service taps.— 89, of which none are metered.

Pressure.— 85 pounds per square inch.

Storage.— Impounding reservoir, 18,000 gallons; distributing reservoir, 250,000 gallons.

Purification.— None.

Reference to previous investigations.— 30th Annual Report of this Department, Vol. 2, page 278.

At the time of the previous investigation in 1909, an auxiliary supply was derived at times from Hammond creek at a point about three-fourths of a mile southwest of the village. Above the intake this stream had a watershed of about 1½ square miles with a population of about 50. On this watershed were several sources of serious pollution. It was accordingly recommended that the intake on Hammond creek be abandoned and that steps be taken to either move the intake up-stream above sources of contamination or to develop some other satisfactory source of supply.

It appears from the recent inspection that this recommendation has been carried out and that a new intake has been constructed on a small brook, formerly the outlet of a pond known as Kendall pond, this intake being located above the houses referred to in the previous report. A low dam across the outlet of this pond at the head of the brook on which the new intake has been constructed has raised the elevation of the pond so that the present outlet of the pond is diverted through a new channel into Hammond creek.

The watershed above the impounding reservoir, constituting the original source of supply, is approximately 10 acres in area. There are no houses on this area and the supply from this source may receive contamination only from animals or chance visitors to the reservoir or watershed. It is stated, however, that it is the practice of residents of a nearby house to visit this reservoir to obtain water for domestic purposes. This practice affords certain opportunity for contamination of human origin. The watershed above the new intake is about 100 acres in area and with the exception of a road crossing the brook just above the intake there are no permanent sources of contamination. The springs are so located and developed as to be free from contamination except, possibly, animal pollution from pasture land. A hydro-electric plant located near the waterworks intake is operated by water from Kendall pond and it is possible to divert the water from the tail-race into the new intake. Upon the shores of the pond are some 9 summer cottages with privies fairly well back from the pond. Water from this source should not be admitted into the mains save in case of drought or other emergency.

At the time of the inspection samples of water were collected from the various sources and the results of the analyses of these samples, made by the Division of Laboratories and Research, will be found in the appended table.

The results of the analysis of the sample of regular supply collected from a tap in the village, show a water clear, slightly colored and soft. The figures for nitrogen in its various forms and for oxygen consumed are low indicating the presence of moderate amounts only of decomposing and decomposable organic matter. The total bacterial count is low and organisms of the B. coli type were not found in the 30 c.c. volume tested. The bacterial analyses of the samples from the intakes show comparatively low counts for surface waters and in neither samples were organisms of the B. coli group isolated. The analysis of the sample representing the overflow from Kendall pond, collected at the tail-race of the hydro-electric plant, shows a water rather highly colored but clear and very soft. The results indicate the presence of larger

amounts of organic matter than in the regular supply. The amount of iron found approaches the amount liable to interfere with laundry work. The presence of the B. coli type in a 10 c.c. inoculation tested indicates the presence of a certain amount of active contamination.

In view of the above facts the following conclusions may be drawn:

1. That the Berlin Water Co. have carried out the recommendation of the 1909 report of this Department with respect to the abandonment of the intake on Hammond creek and the installation of a new intake above the sources of pollution noted in the previous report.
2. That the present sources of water supply for Berlin, provided steps are taken to maintain them in proper sanitary condition at all times, should afford a supply of reasonably satisfactory physical and sanitary quality, although the brook supplies, as is true of all surface supplies, are open to accidental, incidental or wilful contamination by chance visitors upon the watershed.
3. That the trespassing upon the shore of the southern reservoir, incidental to the securing of water therefrom by nearby residents, affords opportunity for contamination of the supply.
4. That the supplementary supply from the overflow of Kendall pond is open at times to a certain amount of contamination from the summer population resident around the pond, and is also somewhat undesirable on account of its high color and the presence of iron.

I would recommend, therefore:

1. That the Berlin Water Co. consider making application to this Department for the enactment of rules and regulations for the sanitary protection of their supply in order to reduce the dangers of chance contamination by visitors upon the watersheds.
2. That trespassing around the various reservoirs and intakes be forbidden and this prohibition be strictly enforced.
3. That the supplementary supply from the Kendall pond outlet be used only in case of extreme urgency.

I would further recommend that copies of this report be transmitted to the Berlin Water Co., to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 27, 1917

REPORT OF WATER ANALYSIS FOR BERLIN

Source	Tap in village	Tap in village	Main intake at brook	Intake at small brook	Tail race E. L. sta. below Kendall pond
Collected on	8/13/09	4/12/17	4/12/17	4/12/17	4/12/17
Color	18	4.0	.....	.....	1 a.
Odor, hot	.....	1 v.	.....	.....	1 a.
Odor, cold	.....	1 v.	.....	.....	.....
Turbidity	3	Tr.	.....	.....	Tr.
Iron	.....	.....	.....	.....	0.5
Loss on ignition	.....	.....	.....	.....	.....
Mineral residue	.....	.....	.....	.....	.....
Ammonia, free	.008	0.01	.....	.....	0.025
Ammonia, albuminoid	.124	0.018	.....	.....	0.058
Nitrites	.002	0.002	.....	.....	Tr.
Nitrates	0.04	Tr.	.....	.....	0.04
Oxygen consumed	4.3	2.7	.....	.....	5.7
Chlorine	0.25	1.0	.....	.....	1.5
Hardness, total	20.8	23.4	.....	.....	11.1
Alkalinity	14.0	24.0	.....	.....	7.0
Bacteria per c.c.	525	15	80	180	45
B. coli type 10 c.c.	+	0+3—	0+3—	0+3—	1+2—
B. coli type 1 c.c.	+	0+3—	0+3—	0+3—	0+3—
B. coli type 1/10 c.c.	+	0+3—	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

BOONVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Boonville made by Mr. C. M. Baker, assistant engineer, on October 24, 1916.

Boonville is an incorporated village of 1909 inhabitants, according to the 1915 census, located in the northern part of Oneida county on the Utica and Watertown branch of the N. Y. C. & H. R. R. R., 35 miles north of Utica. It is in the center of a prosperous dairying district. The village is provided with a combined system of sewers which discharge without purification into the Black River canal.

The water supply is owned by the municipality and was first put into operation in 1898 or 1899. Since the original installation, about 1914, additional storage has been provided by the construction of a second dam. The supply is derived from impounding reservoirs on a small spring brook about 2 miles southwest of the village. From the reservoirs the water flows by gravity to the village distribution system, no purification being provided. Practically all of the population are served, there being some 500 service taps, only 75 of which are metered. Due to the limited number of meters and lack of other adequate method for measuring the water used, no definite information could be obtained regarding the consumption, but based on a per capita rate of 100 gallons daily the total consumption would be approximately 190,000 gallons per day. There are in all about 9 miles of water mains ranging in size from 4 to 12 inches in diameter. The pressure in the village ranges from 55 to 75 pounds per square inch, depending upon the elevation.

Originally an earthen dam with a clay puddle core was constructed across the stream just below the junction of two small brooks, this dam forming an impounding reservoir of about 6,000,000 gallons capacity. Due to trouble from algæ, however, and difficulty in cleaning this reservoir without reserve

storage, a second dam was built above the first, forming a second reservoir of about 500,000 gallons capacity. Connections are provided whereby water may be drawn from either reservoir. The sides of the lower reservoir are rip-rapped with stone, while those of the upper reservoir are protected by concrete. The reservoirs are thoroughly cleaned each year and since this practice has been followed there has been little or no trouble from algæ.

The watershed tributary to the supply has an area of about one-half square mile. There are two families living on this area but the houses are well back from the streams. The total population is about 10 persons, an equivalent to 20 per square mile. Fourteen acres of land in the immediate vicinity of the reservoirs are owned by the village. This area is enclosed by a substantially constructed fence and no insanitary conditions were observed within the enclosure. Just above the land owned by the village, however, is pasture land in which cattle and live stock have free access to the streams tributary to the supply. It is apparent, therefore, that although no insanitary conditions were observed on the watershed causing direct contamination of the supply from human origin, there is considerable direct pollution from cattle and live stock.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water at times high in color and occasionally somewhat high in turbidity. The figures for nitrogen in its various forms are at times high as are also the figures for chlorine, thus indicating the presence of pollution. The bacterial counts are at times very high and colon bacilli are prevalent in the 10 c.c. inoculations, frequently present in 1 c.c. and occasionally in 1/10 c.c. inoculations, thus indicating the presence of active and potentially dangerous contamination.

As a result of this investigation it may be concluded that the water supply of Boonville is subject to pollution:

(a) Possibly, at times, of human origin from inhabitants and trespassers on the watershed.

(b) From cattle and live stock which have free access to the streams tributary to the supply.

In view of the above I beg to offer the following recommendations to be acted upon by the village authorities:

1. That the matter of providing adequate purification of the supply by means of filtration, or filtration supplemented by chlorination be given careful consideration.

2. That pending the development of a complete purification plant, apparatus be installed with as little delay as possible for the purification of the supply with liquid chlorine and that this plant be carefully and effectively operated at all times in order to minimize the danger of contaminated water reaching the consumers.

The carrying out of recommendation No. 2 would render the supply comparatively safe from a sanitary standpoint, the cost would be but little and the chlorination plant could be used later in connection with any other method of purification developed. Chlorination alone, however, will not improve the physical qualities of the supply with respect to color and turbidity and for this reason careful consideration should be given, as recommended above, to the development of a complete and adequate purification plant. In the development of this complete purification plant, the village authorities should employ the services of a competent sanitary expert to make a study of the problem and advise them as to the proper procedure.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 8, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			Bacteria per c.c.; gelatin 20°, 48 hours	B. COLI TYPE +=PRESENT —=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
Boonville	Oneida	Intake No. 1 of reservoir	8/18/10																1,100	+	+	+
Boonville	Oneida	Intake No. 2 of reservoir	8/18/10																1,100	+	+	+
Boonville	Oneida	Reservoir	8/18/10																300	—	—	—
Boonville	Oneida	Tap, public trough	8/18/10																1,200	+	—	—
Boonville	Oneida	Tap, public supply	3/15/11	15	2			114		97	.046	.024	.001	1.20	0.80	0.75	85.7	85.0	50	+	—	—
Boonville	Oneida	Tap, public supply	6/ 2/11	25	20			103		85	.010	.150	.001	0.10	3.80	0.50	72.9	70.0	750	+	+	+
Boonville	Oneida	Tap, public supply	10/11/11	15	5			89		85	.018	.084	.001	0.04	2.50	0.25	62.9	62.0	90	+	—	—
Boonville	Oneida	Tap, public supply	12/28/11	5	3			76		69	.020	.056	.001	0.26	2.30	0.75	55.7	55.0	850	+	+	+
Boonville	Oneida	Tap, public supply	2/15/12	5	Cl.			125		113	.030	.030	Tr.	0.60	1.05	1.00	88.6	84.0	15	—	—	—
Boonville	Oneida	Tap, public supply	3/20/12	5	Tr.			109		98	.038	.014	.002	0.50	0.80	1.00	97.1	90.0	70	—	—	—
Boonville	Oneida	Tap, public supply	4/22/12	15	Tr.			78		67	.004	.068	Tr.	0.14	1.90	0.50	32.5	28.0	140	—	—	—
Boonville	Oneida	Tap, public supply	9/10/12	20	8			126		106	.038	.082	.001	0.16	2.10	0.50	97.1	88.0	100	+	+	—
Boonville	Oneida	Tap, public supply	10/28/12	10	Tr.			96		86	.022	.098	.001	0.26	3.70	0.50	65.7	64.0	1,800	+	+	—
Boonville	Oneida	Tap, public supply	12/ 9/12	15	5			72		60	.024	.064	Tr.	0.26	2.80	0.50	45.7	39.0	1,900	+	—	—
Boonville	Oneida	Tap, public supply	1/15/13	15	Cl.			103			.054	.036	.004	0.40	1.80	1.00	74.3	64.0	1,000	—	—	—
Boonville	Oneida	Tap, public supply	2/17/13	5	Tr.			95			.022	.046	Tr.	0.60	1.30	1.00	81.4	72.0	250	—	—	—
Boonville	Oneida	Tap, public supply	3/31/13	10	5			50			.014	.072	Tr.	0.24	3.00	0.75	26.0	23.0	600	+	—	—
Boonville	Oneida	Tap, public supply	5/12/13	2	2			111			.010	.054	Tr.	0.44	1.40	0.75	85.7	84.0	50	—	—	—
Boonville	Oneida	Tap, public supply	6/23/13	Tr.	Cl.			99			.006	.034	Tr.	0.20	1.20	0.25	74.3	73.0	.....	—	—	—
Boonville	Oneida	Tap, public supply	7/28/13	12	3			122			.034	.008	.001	0.18	2.40	1.50	87.1	85.0	800	+	—	—
Boonville	Oneida	Tap, public supply	5/18/14	25	5			85		66	.006	.052	Tr.	0.34	3.00	0.50	61.4	59.0	2,000	+	+	—
Boonville	Oneida	Reservoir	10/24/16																600	3+0—	1+2—	0+3—
Boonville	Oneida	Tap in village	10/24/16	5	Tr.	1 v.	1 v.				.002	.064	.001	0.20	2.36	1.00	78.6	83.0	700	3+0—	2+1—	0+3—

BRASHER FALLS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an inspection of the public water supply of Brasher Falls, made on May 1, 1917, by Mr. M. F. Sanborn, assistant engineer in this Department.

Brasher Falls is an unincorporated village with an estimated population of about 600, and is located in the northeastern part of St. Lawrence county, on the St. Regis river, and about 1½ miles from Winthrop station on the Rutland railroad.

The village is not provided with a public sewer system, although there is a small private sewer serving a few houses, while the remaining houses are served by privies and cesspools.

The water supply is derived from the St. Regis river, just above the dam located at the village. The supply is used principally for fire purposes, but there are a convent, hotel and four houses connected with the system, although the water is not supposed to be used for drinking purposes. The supply was installed in 1907, after the design and under the direction of the Board of Water Commissioners of the Brasher Falls Water District. There is about one-fourth of a mile of 3-inch pipe, connected to which are 6 fire hydrants located in the lower part of the village. There are only 6 service taps, none of which are metered.

Water is pumped at the mill of the Brasher Falls Milling and Lighting Company from the flume leading to the water wheel of the mill. The pump is operated about four times a week, the water being stored in tanks located at the various places supplied. In case of fire the water is pumped directly into the mains.

The St. Regis river above Brasher Falls has a watershed of approximately 875 square miles upon which there is a resident population which may be estimated at 7,000, or 8 per square mile. The river receives sewage pollution at the various villages and hamlets located along its course and general pollution from surface run-off. The water is highly colored and is objectionable both from sanitary and æsthetic standpoints. An analysis of the river water collected above the village of Winthrop shows a colored and soft water free from turbidity. The total bacterial count is excessive and fecal organisms of the B. coli type were isolated from inoculations as small as 1 c.c., indicating active and potentially dangerous contamination.

In view of the above facts the following conclusions may be drawn:

1. That the water supply of Brasher Falls derived from the St. Regis river is unfit for domestic use.
2. That the entire waterworks system is inadequate and unsatisfactory for general public purposes.

I would, therefore, recommend:

1. That the village authorities consider the installation of a complete waterworks system sufficient to provide for the needs of the entire village for domestic purposes and for fire protection.
2. That before taking the steps recommended above the village retain a competent engineer to prepare plans for the development of an adequate water supply system derived from a source free from all possibilities of contamination.
3. That if the present supply is retained its use for drinking purposes be strictly avoided.

I would further recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 27, 1917

REPORT OF WATER ANALYSIS FOR BRASHER FALLS.

Source	St. Regis river at Winthrop
Collected on	5/1/17
Color	70
Odor, hot	1 e.
Odor, cold	1 a.
Turbidity	Tr.
Solids, total	.....
Loss on ignition	.....
Mineral residue	.....
Ammonia, free	0.014
Ammonia, albuminoid	0.122
Nitrites	Tr.
Nitrates	0.03
Oxygen consumed	9.0
Chlorine	0.75
Hardness, total	23.4
Alkalinity	21.0
Bacteria per c.c.	3,700
B. coli type 10 c.c.	3+0—
B. coli type 1 c.c.	3+0—
B. coli type 1/10 c.c.	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

BROCKPORT

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the sanitary condition of the public water supply of Brockport, made by Mr. C. M. Baker, assistant engineer, on August 1, 1917.

General information

Location.—Near western boundary of Monroe county. On Niagara Falls branch of N. Y. C. & H. R. R. R.

Population.—3368, practically all of which is served with the water.

Source of supply.—Lake Ontario, at a point about 12 miles north of village.

Consumption.—Average for year ending March 1, 1917 — 241,887 gallons daily, equivalent to 72 gallons per capita.

Distribution system.— Water is pumped from the lake through about 17 miles of mains ranging from 4 to 14 inches in diameter, excess going to a storage reservoir located in the southern part of the village.

Service taps.—About 1,150, of which 800 or 900 are metered.

Pressure.—Eighty pounds per square inch.

Storage.— Distributing reservoir, 1,500,000 gallons.

Purification.— Coagulation and sedimentation, pressure mechanical filters and sterilization with liquid chlorine.

References to previous investigations.— 1915, page 294, 36th Annual Report.

At the time of the preceding investigation it was pointed out that the water of Lake Ontario at the intake is subject to a small amount of intermittent contamination from the sewage of the city of Rochester, discharging into the lake through the Genesee river; also that the lake water is at times turbid. It was further pointed out that due to the lack of proper sedimentation satisfactory results were not being obtained by the process of purification.

In view of the above, the following recommendations were then made:

1. That, as recently advised by this Department, the shunt system of alum application be abandoned and measures taken for constantly applying the coagulant by means of a gravity feed apparatus.
2. That it would be advisable to consider the use of the present hypochlorite plant, if possible, for the application of the alum solution and the substitution of apparatus for applying liquid chlorine to the water instead of hypochlorite of lime.

These recommendations have since been completely carried out by the village, the old hypochlorite plant being converted into a plant for applying alum to the intake well and a Wallace & Tiernan chlorination apparatus installed for the sterilization of the supply with liquid chlorine.

Alum is applied in amounts ranging from .5 to 2.00 grains per gallon, the normal amount usually being .7 to .9 grains per gallon. Some difficulty was experienced, however, during the spring in securing proper sedimentation. The suction well is circular in plan, having a diameter of about 27 feet and a depth of water of about 32 feet. A wall through the center divides it into two sections, one for each of the pumps. Circular baffles are provided to assist in the proper distribution of the water. The total capacity of the suction well is about 137,000 gallons or the capacity of each compartment is 68,500 gallons. In normal operation only one pump is used, it having a capacity of 1,000,000 gallons daily. The detention period in the coagulating basin is therefore 1.6 hours. If, hower, a suitable gate were provided in the division wall by means of which the full capacity of the suction would be available for sedimentation, this detention period could be doubled or made equivalent to 3.2 hours. The change undoubtedly would materially assist in obtaining proper sedimentation of the water.

The chlorine plant was installed and put into operation on May 2, 1917, and consists of a Wallace & Tiernan solution feed manual control chlorinator, the chlorine being applied into the suction line of the pump. No scales are provided to check the operation of the apparatus by the amount of chlorine actually applied. At the time of the inspection 8.2 seconds were required for one pulsation of the chlorine meter which, according to the operation chart, corresponds to 2.84 pounds per 24 hours or approximately .34 part per million of chlorine. No definite check, however, could be made upon this figure since, as pointed out above, no scales are provided, and a complete cylinder of chlorine had been used since the installation of the apparatus. If the total amount indicated, namely, .34 parts per million, was being applied, it seems probable that satisfactory sterilization would be obtained.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which, together with other analyses made since the previous investigation, are recorded in the appended table.

The results of analyses of samples collected in March, 1917, show a high bacterial count in both the raw and treated waters with colon bacilli present in 10 c.c. inoculations, thus indicating inefficient purification at that time. The results of analyses of the samples collected at the time of this investigation show high bacterial counts in all samples, which, however, may be largely due to after-growths in transit, since two days elapsed from the time the samples were collected until they were received at the laboratory. Colon bacilli were present in 10 c.c. inoculations of the raw water, of the effluent from the coagulation basin, and of the sample collected from a tap in the village; while the effluent from the coagulation basin after chlorination showed no coli. It is apparent from these results that effective purification is not at all times being obtained. As pointed out above, the rate of chlorine application as indicated by the chlorine meter at the time of the inspection should be sufficient to secure satisfactory sterilization. The analyses, however, do not bear out this conclusion. The unsatisfactory analytical results may, however, be due to the possibility that the amount of chlorine indicated by the apparatus was not actually being applied or to the existence of residual pollution which passed the plant at a time when a less amount of chlorine was being applied than at the time of the inspection.

As a result of this investigation, it may be concluded:

1. That the village of Brockport has carried out the recommendations of our previous report.

2. That some difficulty has been experienced in securing proper sedimentation of the water after coagulation, due probably to an insufficient detention period.

3. That, although the apparatus indicated that a sufficient amount of chlorine was being applied at the time of the inspection, it is apparent from the analytical results that satisfactory sterilization is not at all times being secured.

In view of the above, I beg to offer the following recommendations, to be acted upon by the village authorities:

1. That a gate be provided in the division wall of the coagulating basin or intake well in order that its full capacity may be used to secure more adequate sedimentation and to allow for a longer period for the coagulation reaction.

2. That regarding operation of the chlorine apparatus:

(a) Scales be provided to check the operation of the apparatus by weighing the actual amount of chlorine applied.

(b) That complete records be kept regarding the operation of the apparatus, including time of observation, rate as indicated by chlorine meter, scale readings, times at which new cylinders of chlorine are connected with the apparatus, rate of pumping at time of observation, difficulties and any other information of interest regarding the operation of the plant.

3. That chlorine be applied at all times in an amount equivalent to not less than .3 of a part per million and that at times when there is a heavy load upon the filters or at times when for any other reason effective filtration is not obtained, the amount of chlorine be increased sufficiently to secure satisfactory sterilization of the water.

I would further recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 15, 1917.

REPORT OF WATER ANALYSIS FOR BROCKPORT

Source	Raw water	Tap City hall	Raw water	Effl. from coag. basin	Effl. from coag. basin + chlorine	Tap in village
Collected on	3/7/17	3/7/17	8/1/17	8/1/17	8/1/17	8/1/17
Color	15	12	0	.....	.....	0
Odor, hot	1 v.	1 v.	3 v.	.....	.....	1 v.
Odor, cold	1 v.	1 v.	2 g	.....	.....	1 v.
Turbidity	6	3	2	.....	.....	0
Solids, total	.....	.....	.....	.....	.....	.....
Loss on ignition	.....	.....	.....	.....	.....	.....
Mineral residue	.....	.....	.....	.....	.....	.....
Ammonia, free	0.021	0.0174	.056	.....	.....	.012
Ammonia, albuminoid	0.16	0.158	.138	.....	.....	.088
Nitrites	0.012	0.013	.002	.....	.....	Tr.
Nitrates	0.4	0.32	.06	.....	.....	.10
Oxygen consumed	1.4	1.60	2.8	.....	.....	1.9
Chlorine	10.50	10.6	9.5	.....	.....	9.5
Hardness, total	114	135	100	.....	.....	114.2
Alkalinity	98	96	98	.....	.....	99
Bacteria per c.c.	2,100	1,100	1,800	48,000	72,500	3,600
B. coli type 10 c.c.	1+2—	2+1—	3+0—	2+1—	0+3—	2+1—
B. coli type 1 c.c.	0+3—	0+3—	0+3—	1+2—	0+3—	0+3—
B. coli type 1/10 c.c.	0+3—	0+3—	0+3—	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4 decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

BROOME COUNTY TUBERCULOSIS HOSPITAL

(Plans for Water Supply and Sewage Disposal. See Section 1-a, p. 39.)

BURKE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of the village of Burke, made on May 3, 1917 by Mr. M. F. Sanborn, assistant engineer in this Department.

Burke is an unincorporated village with a population of about 300, located in the town of Burke in the northeastern part of Franklin county, on the Rutland railroad and about 8 miles northeast of Malone. The village is unprovided with a public sewer system, the houses being served by cesspools, septic tanks and privies.

The public water supply is derived from several springs located near Adler Brook 1½ miles southeast of the village. The waterworks are owned and operated by the Burke Water Company which designed the works and constructed them by day labor in 1890. Practically the entire population of the village is served by the supply with a daily water consumption of approximately 15,000 gallons. There are 3½ miles of water mains ranging from 1 inch to 2 inches in diameter. Of the 60 service taps none are metered. The supply is distributed by gravity with an average pressure in the village of about 20 pounds per square inch. No provision is made for fire protection from the public supply.

The springs from which the supply is obtained are developed by masonry and timber basins, both open and covered, with lines of drain tile with open joints leading into them. The water collected in these basins flows into a small covered reservoir just below the springs. This reservoir is divided into two compartments each 12 feet square and 6 feet deep, the total capacity being 13,000 gallons or approximately 1 day's supply. This reservoir is cleaned once a year in the spring.

The springs are rather poorly developed inasmuch as there is opportunity for surface wash from adjacent pasture land to reach them. A small amount of the area around the springs is owned by the water company and some of the springs are surrounded by fences. Save for the possibility of accidental or wilful pollution by visitors in the vicinity of the springs there seems to be little opportunity for pollution of human origin.

At the time of the inspection a sample of water was collected from a tap in the village and the results of the analysis of this sample together with others made in the past by the Division of Laboratories and Research will be found in the appended table.

The results of these analyses show a water practically clear and colorless and moderately hard. The figures for nitrogen in its various forms, with the exception of those for nitrates, are low indicating the presence of moderate amounts only of decomposable or decomposing organic matter. The comparatively high figures for nitrates, however, indicate the presence of considerable past pollution, rendered on the whole inactive by natural processes of purification. The bacterial counts are usually moderate although occasionally high. Organisms of the B. coli type have been frequently isolated from the 10 c.c. inoculations tested, indicating the presence of a certain amount of active contamination due probably to surface wash from pasture land adjacent to the springs.

In view of the above facts the following conclusions may be drawn:

1. That the public water supply of Burke is derived from springs which if more carefully developed and more thoroughly protected from surface wash should afford a supply of reasonably satisfactory physical and sanitary quality.

2. That some of the springs, however, are open to pollution by drainage from pasture land and consequently must be considered somewhat questionable from a sanitary standpoint.

In view of the above conclusions the following recommendations may be made:

1. That the Burke Water Company develop the springs tributary to their supply more adequately by the construction of permanent basins of masonry or other suitable material with side walls extending at least one foot above the surface of the ground and provided with covers.

2. That the entire area around the springs be properly fenced and suitable drainage ditches be constructed in order to divert surface wash from the immediate vicinity of the springs.

I would further recommend that copies of this report be transmitted to the Burke Water Company, to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July* 3, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Burke	Jefferson	Tap, public supply	2/ 1/10	Tr.	Cl			80		60	.028	.024	.003	1.00	0.50	0.87	60.0	54.0	220	+	—	—
Burke	Jefferson	Tap, public supply	11/12/10	Tr.	Cl.			90		67	.008	.042	.002	4.80	0.50	1.25	60.0	58.0	70	+	—	—
Burke	Jefferson	Tap, public supply	3/10/11	Tr.	Cl.			102		65	.026	.030	.002	2.40	0.90	1.00	61.0	60.0	300	+	+	—
Burke	Jefferson	Tap, public supply	10/ 7/11	10	Cl.			113		84	.010	.026	.001	1.60	1.30	1.00	71.0	65.0	850	+	+	—
Burke	Jefferson	Tap, public supply	11/14/11	Tr.	Tr			112		67	.018	.044	.001	2.10	0.60	1.75	64.0	63.0	275	+	—	—
Burke	Jefferson	Tap, public supply	1/ 6/12	5	5			101		79	.016	.018	Tr.	2.00	0.90	1.25	64.0	63.0	90	+	—	—
Burke	Jefferson	Tap, public supply	3/14/12	5	Cl.			91		75	.016	.022	Tr.	2.40	1.60	0.75	71.0	64.0	150	+	—	—
Burke	Jefferson	Tap, public supply	4/18/12	3	Cl.			104		85	.004	.052	.001	1.80	1.40	0.75	56.0	51.0	850	+	—	—
Burke	Jefferson	Tap, public supply	9/ 7/12	1	1			115		95	.002	.016	Tr.	1.60	0.80	1.00	59.0	53.0	575	+	—	—
Burke	Jefferson	Tap, public supply	10/25/12	Tr.	Cl.			132		102	.004	.026	.001	2.20	0.80	1.00	66.0	57.0	450	+	—	—
Burke	Jefferson	Tap, public supply	12/ 5/12	Tr.	Cl.			92		66	.008	.054	Tr.	3.00	2.30	0.87	53.0	48.0	40	+	—	—
Burke	Jefferson	Tap, public supply	1/19/13	Tr.	Cl.			102			.010	.032	Tr.	2.20	0.80	0.25	60.0	51.0	40	+	—	—
Burke	Jefferson	Tap, public supply	2/14/13	Tr.	Cl.			83			.014	.042	Tr.	1.40	0.80	1.00	60.0	51.0	60	+	—	—
Burke	Jefferson	Tap, public supply	3/27/13	Tr	Cl.			94			.008	.036	Tr.	1.80	2.50	0.75	59.0	52.0	150	+	—	—
Burke	Jefferson	Tap, public supply	5/ 8/13	3	Cl.			94			.008	.028	Tr.	1.60	1.00	0.50	61.0	59.0	80	+	—	—
Burke	Jefferson	Tap, public supply	6/19/13	5	Tr.			110			.004	.018	Tr.	0.16	1.70	0.87	66.0	60.0	160	+	—	—
Burke	Jefferson	Tap, public supply	7/24/13	Tr.	Cl.			98			.004	.036	Tr.	1.50	0.60	1.50	71.0	62.0	20	—	—	—
Burke	Jefferson	Tap, public supply	5/13/14	5	Tr.			100		79	.004	.020	.001	2.00	1.60	1.25	54.0	53.0	60	+	—	—
Burke	Jefferson	Tap, public supply	5/ 3/17	2	Tr.	1 v.	2 v.				.003	.011	Tr.	Tr.	0.90	2.50	63.0	54.0	45	2+1—	0+3—	0+3—

CAMBRIDGE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of the village of Cambridge, Washington county. An investigation of this supply was made on April 10, 1917, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Mr. E. B. Norton, secretary, and Mr. William Shyland, superintendent of the Cambridge Water Company, and Dr. W. A. Leonard, health officer of the village.

Cambridge is an incorporated village in the southern part of Washington county and is located about 30 miles northeast of Troy, on the D. & H. R. R. and the Owl kill. The population at the time of the inspection was estimated to be about 1,730.

There is one private sewer which serves a few of the houses, the remaining population of the village being served largely by cesspools and privies.

The water supply is owned by the Cambridge Water Works Company, of which Mr. Robert R. Law is president. The waterworks were designed by Mr. C. T. Howley and were constructed by contract under the direction of Mr. Howley in 1887.

The water supply is obtained from springs about 3 miles northeast of the village and from an impounding reservoir on a small brook about 1 mile southeast of the springs. The water from the springs is pumped to the distribution system and reservoir, while the water from the brook flows from the reservoir to the village by gravity.

About 1,380 of the inhabitants, which corresponds to 80 per cent of the total population, are served by this water supply. The average daily consumption was estimated to be about 138,000 gallons. There are approximately 6 miles of water mains, ranging in size from 4 inches to 8 inches in diameter. Of the 375 houses in the village about 300 are served by this water supply and 90 per cent of these services are metered. The average pressure in the village is about 75 pounds per square inch. Fire protection is provided by 43 hydrants placed in the various parts of the village.

The spring supply has been developed by the construction of an open artificial basin at the location of the several springs. This basin is about 100 by 250 feet in plan and about 5 feet deep, and has a capacity of about 1,000,000 gallons. There is usually sufficient water from these springs to operate a breast water wheel, which in turn pumps water into the mains. No apparent sources of contamination were found in the vicinity of the spring basin.

There are two pumping stations, one containing the water power apparatus and the other an auxiliary steam plant. The one containing the water power plant is of brick, 20 by 30 feet in plan. The breast water wheel is 12 feet in diameter and 4 feet broad, and operates two water cylinders having 5 inches diameter and strokes of about 13 inches. The pumping station containing the auxiliary plant is also of brick and about 20 by 30 feet in plan. This station contains an Erie City Iron Works horizontal boiler and a Worthington duplex double-action pump, 10 by 6 inches in size. It was stated by the superintendent that the water company expects later to install a larger pump.

The reservoir is formed by the construction of a dam across a small brook. This reservoir is about 200 by 100 feet in plan and has a depth of about 9 feet and a capacity of 1,300,000 gallons. A ditch has been dug along the northerly side of the reservoir so that the water from the watershed above the reservoir may be by-passed in case of turbid water or when it is desired to clean the reservoir. The brook above the reservoir has a watershed of about .12 square mile. The topography is very hilly and consists of much wooded land. There are no people living upon the watershed. The water company formerly owned most of the watershed but they have recently sold a portion of it with the restriction that no houses were to be placed upon it.

Considerable trouble has been caused in the past from algae in the spring basin and reservoir and generally each spring copper sulphate has been added to the water. About 10 pounds are used at a time in the reservoir and about

8 pounds in the spring basin. This gives a proportion of about one part per million of copper sulphate in both the waters of the spring basin and the reservoir. At the time of the inspection a certain amount of algae growths were observed in the spring basin. Upon examination these growths were found to consist largely of zygnema and of a small amount of spirogyra.

Samples of water were obtained at the time of the inspection from a tap in the village and from the various sources, and the analyses of these samples, together with those previously made by the Division of Laboratories and Research, will be found in the appended table.

From the results of these analyses it will be seen that the water is usually clear and free from color and moderately hard. Nitrogen in its various forms is usually low and the figures for the albuminoid ammonia and oxygen consumed at times indicate the presence of moderate amounts only of organic matter apparently derived from decaying vegetation upon the watershed. The chlorine figures are at times slightly in excess of that which may be considered normal for this region. The numbers of bacteria are usually low and organisms of the B. coli type have occasionally been found in 10 c.c. inoculations only.

As a result of this investigation and of the analyses the following conclusions may be drawn:

1. That the public water supply of Cambridge is of a fairly satisfactory sanitary quality as shown by the sanitary survey and by the analyses.
2. That the growths of algae in the spring basin and to some extent in the reservoir cause tastes and odors in the water at certain times of the year, although this trouble has been largely reduced by the application of copper sulphate.

In view of the above conclusions, I would make the following recommendations:

1. That the water company at all times properly protect the various sources of the water supply from all possible contamination.
2. That the algae growths in the spring basin be removed at frequent intervals by raking and, in case this measure is not sufficient to prevent tastes and odors, copper sulphate be carefully applied to the basin and reservoirs in quantities not greater than those used in the past.

I would finally recommend that copies of this report be transmitted to the Cambridge Water Works Company, to the health officer of the village of Cambridge and to the sanitary supervisor for the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 14, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			Bacteria per c.c.; gelatin 20°, 48 hours	B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
Cambridge	Washington	Tap in village	3/ 1/11	10	5			71		48	.020	.030	.001	0.50	1.90	2.50	39.0	37.0	1,200	+	—	—
Cambridge	Washington	Tap in village	10/ 3/11	10	Cl.			103		91	.018	.018	.001	0.60	1.15	2.00	81.4	81.0	100	—	—	—
Cambridge	Washington	Tap in village	12/15/11	Tr.	Cl.			90		80	.004	.076	Tr.	0.30	0.80	1.62	50.0	49.0	120	—	—	—
Cambridge	Washington	Tap in village	1/30/12	Tr.	Cl.			70		52	.036	.040	Tr.	0.50	0.90	1.00	50.6	40.6	70	+	—	—
Cambridge	Washington	Tap in village	3/12/12	Tr.	Cl.			60		52	.010	.046	Tr.	0.52	1.50	1.00	40.3	33.0	2,700	+	—	—
Cambridge	Washington	Tap in village	4/18/12	5	Cl.			108		88	.006	.016	.001	0.34	0.20	1.00	57.1	48.0	20	—	—	—
Cambridge	Washington	Tap in village	9/17/12	Tr.	Cl.			150		129	.004	.002	.001	0.68	0.50	1.75	94.5	84.0	120	+	—	—
Cambridge	Washington	Tap in village	11/12/12	10	Cl.			83		63	.014	.058	.001	0.34	1.50	0.37	60.0	52.0	70	+	—	—
Cambridge	Washington	Tap in village	12/27/12	Tr.	Cl.			78		70	.014	.060	Tr.	0.44	1.00	1.00	57.1	55.0	80	—	—	—
Cambridge	Washington	Tap in village	2/18/13	Tr.	Cl.			77			.022	.048	Tr.	0.34	1.10	1.50	51.4	49.0	20	—	—	—
Cambridge	Washington	Tap in village	4/24/13	Tr.	Cl.			117			.024	.010	Tr.	0.70	0.20	1.50	78.6	75.0	10	—	—	—
Cambridge	Washington	Tap in village	6/27/12	Tr	Cl.			125			.004	.018	.002	0.70	0.50	1.25	82.9	82.0	20	—	—	—
Cambridge	Washington	Tap in village	4/ 8/14	Tr.	Tr.			88		81	.006	.026	.001	0.34	0.80	1.50	55.7	54.0	50	—	—	—
Cambridge	Washington	Tap in village	4/10/17	Cl.	Tr.	1 a.	1 v.				.007	.007	Tr.	Tr.	1.25	1.50	57.7	30.0	40	1+2—	0+3—	0+3—
Cambridge	Washington	Brook water	4/10/17																120	1+2—	0+3—	0+3—
Cambridge	Washington	Spring water	4/10/17																160	0+3—	0+3—	0+3—

CANASERAGA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the public water supply of the village of Canaseraga, Allegany county. An investigation of this supply was made on December 6, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection, by Dr. C. G. Schwan and Mr. Fred Mehlenbacher, superintendent of waterworks.

Canaseraga is an incorporated village in the northwestern part of Allegany county and about 15 miles northwest of Hornell. It is on Canaseraga creek, a tributary of the Canisteo river, and is on the Erie railroad and the P. S. & N. railroad.

There are no public or private sewers in the village. Excretal and other wastes are disposed of in septic tanks, cesspools and privies.

The water supply is owned by the village and is under the control of the board of water commissioners. The waterworks were designed by Mr. E. D. Smalley, civil engineer of Syracuse, and were constructed under his direction in 1905.

The water is obtained from about 12 springs located about 1½ miles north of the village. The water from these springs flows by gravity to a collecting basin whence it passes into the pipe line leading to the village and to the reservoir located on a hill in the southeastern part of the village. About 612 of the inhabitants, or about 90 per cent of the total population, are served by this supply. The average daily consumption was estimated to be about 61,200 gallons. There are about 6½ miles of water mains varying from 4 to 6 inches in diameter. The average pressure in the village is about 100 pounds per square inch. There are 31 hydrants placed in various parts of the village for fire protection.

The reservoir is open, about 75 feet square and 7 feet deep and has a capacity of about 190,000 gallons. The sides of this reservoir have a slope of about 1 to 1 and the bottom and the lower side are paved with brick. Ice has at times in the past been cut from the reservoir. The reservoir is said to be cleaned out every three years and the street mains are flushed two and three times a year.

The springs are all located near the base of a large hill and the ground in the vicinity of the springs is swampy. These springs are developed by the construction of various kinds of chambers built principally of dry rubble walls covered with planks. Many of the springs are poorly developed and some of the covers were in poor condition. The collecting chamber is about 8½ feet in diameter and 5½ feet deep and contained about 2 feet of water at the time of the inspection. Cattle are allowed to pasture around the springs and it is probable that at times surface water, contaminated by animal wastes, reaches the springs. Otherwise there seems to be no source of pollution in the vicinity of the springs.

At the time of the inspection a sample of the water was collected from a tap in the village and the results of the analysis of this sample, together with those previously made by the Division of Laboratories and Research, will be found in the appended table.

From the results of these analyses, it will be seen that the water is usually clear, free from color and quite hard. The figures for nitrogen in its various forms are usually low although occasionally those for free ammonia are high These high figures for free ammonia, together with those for oxygen consumed and chlorine, indicate that the water has occasionally received some pollution in the past. The numbers of bacteria have at times been quite high and organisms of the B. coli type have been found occasionally in 10 c.c. inoculations. The pollution indicated by the analyses has evidently been received from the cattle pasturing around the springs and has probably occurred principally during periods of freshets or heavy rains. Pollution might also have been caused by the men cutting ice upon the reservoir, and in this connection it is significant that several of the winter analyses show active contamination.

As a result of this investigation and of the analyses the following conclusions may be drawn:

1. That with the exclusion of cattle from around the springs and with the improvement of the condition of some of the springs, the water should be of a satisfactory sanitary quality.

2. That the practice of ice cutting upon the reservoir renders possible the serious and potentially dangerous pollution of the water supply by the men and animals engaged in this operation.

In view of the above conclusions, I would make the following recommendations:

1. That all the springs be carefully inspected by the village authorities in order that steps may be taken to protect these springs from contamination from surface sources by providing proper covers, diverting ditches for surface water and such other improvements as may be found necessary.

2. That the springs be surrounded with an improved wire fence to keep cattle at least 50 feet from the springs.

3. That the cutting of ice upon the reservoir be prohibited.

I would also recommend that copies of this report be sent to the village authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 28, 1917

REPORT OF WATER ANALYSIS FOR CANASERAGA

Source	Tap in village	Tap in village	Tap in village	Tap in village	Tap in village	Tap in village
Collected on	1/8/12	2/22/12	3/30/12	10/5/12	11/23/12	1/13/13
Color	Tr.	Tr.	Tr.	Cl.	Cl.	5
Odor, hot	.....	.....	.....	.....	.....	.....
Odor, cold	.....	.....	.....	.....	.....	.....
Turbidity	Cl.	Cl.	Tr.	Cl.	Cl.	Tr.
Solids, total	194	193	175	207	200	190
Loss on ignition	.....	.....	.....	.....	.....	.....
Mineral residue	170	175	165	185	185	.....
Ammonia, free	.024	.012	.008	.004	.012	.006
Ammonia, albuminoid	.018	.014	.016	.018	.016	.042
Nitrites	Tr.	.001	Tr.	.001	Tr.	Tr.
Nitrates	0.60	0.48	0.36	0.36	0.60	0.60
Oxygen consumed	0.30	0.40	0.90	0.80	0.10	1.00
Chlorine	1.25	1.75	0.75	1.50	1.75	1.50
Hardness, total	145.8	148.6	154.2	148.6	151.4	140.0
Alkalinity	142	138	130	145	144	133
Bacteria per c.c.	30	80	1,500	8,100	500	30
B. coli type 10 c.c.	+	+	+	—	—	+
B. coli type 1 c.c.	—	+	—	—	—	—
B. coli type 1/10 c.c.	—	—	—	—	—	—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

REPORT OF WATER ANALYSIS FOR CANASERAGA

Source	Tap in village	Tap in village	Tap in village	Tap in village	Tap in village	Tap in village
Collected on	3/10/13	4/21/13	6/7/13	5/28/15	5/28/15	12/6/16
Color	Tr.	Tr.	Tr.	Tr.	.....	Tr.
Odor, hot	.....	.....	.....	1a	.....	1 v.
Odor, cold	.....	.....	.....	1a.	.....	1 v.
Turbidity	Cl.	Cl.	Cl.	3	.....	Cl.
Solids, total	207	205	197	250	.....	.....
Loss on ignition	.....	.....	.....	35	.....	.....
Mineral residue	.....	.....	.....	215	.....	.....
Ammonia, free	.010	.008	.004	.004	.....	.002
Ammonia, albuminoid	.014	.004	.002	.002	.....	.004
Nitrites	Tr.	Tr.	Tr.	.001	.....	.001
Nitrates	0.44	0.60	0.30	0.24	.....	0.36
Oxygen consumed	0.30	0.20	0.10	1.00	.....	90
Chlorine	1.75	1.25	1.50	1.75	.....	1.50
Hardness, total	140.0	180.0	145.8	168.5	.....	228.5
Alkalinity	138	138	139	145	.....	150
Bacteria per c.c	5	2,300	2,100	100	130	15
B. coli type 10 c.c.	—	—	—	—	—	0+3—
B. coli type 1 c.c.	—	—	—	—	—	0+3—
B. coli type 1/10 c.c.	—	—	—	—	—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water; 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

CASTLETON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the sanitary condition of the public water supply of the village of Castleton, made on September 4, 1917, by Mr. M. F. Sanborn, assistant engineer in this Department.

General information

Location.— Rensselaer county, on the bank of the Hudson river, 6 miles south of Albany, on the N. Y. C. & H. R. R. R.

Population.— 1,500, 90 per cent of which is served with the supply.

Waterworks.— Controlled by municipality.

Source of supply.— Vlockie kill, impounding reservoir and intake 3 miles east of the village.

Consumption.— No data.

Distribution system.— Gravity through 11 miles of mains ranging from 6 to 16 inches in diameter.

Service taps.— 300, none metered.

Pressure.— 90 pounds per square inch.

Storage.— 5,000,000 gallons.

Purification.— None.

References to previous investigation.— 1912; report on investigation, page 639. 33d Annual Report of this Department; 1914, inspection preparatory to drafting of rules and regulations.

In the report of the investigation made in 1912 it was pointed out that the supply was subject to pollution from animal and human origin, and it was accordingly recommended that steps be taken to abate any conditions causing direct pollution of the stream tributary to the supply and that if any difficulty be experienced in abating such conditions, application be made to this Department for the enactment of rules and regulations for the sanitary protection of the supply. At the time of the investigation in 1912 the supply

was owned by the water company. In 1913 the supply was purchased by the village and is now controlled and operated under the direction of the board of trustees. In 1914 an inspection of the supply was made following the request from the board of trustees for the enactment by this Department of rules and regulations. A draft of such rules and regulations was prepared and transmitted to the local authorities, but owing to their failure to request the enactment of the rules and regulations the matter has been held in abeyance.

The impounding reservoir is 2 or 3 acres in area and is probably rather shallow. The village owns possibly 10 acres of land in the immediate vicinity of this reservoir. At the northwest corner of the reservoir is a house located about 75 feet distant from the water's edge, but the barns and other outbuildings are located on land sloping away from the reservoir and the drainage from the vicinity of the house is diverted to a point below the reservoir. The land around the reservoir is used to a certain extent for cultivation and animals and poultry are allowed to graze in its immediate vicinity. It is therefore evident that a certain amount of pollution of animal origin may reach the reservoir from this farm. The farm is owned by the village and is occupied by the reservoir keeper.

The watershed area above the reservoir has a total area of about 6 square miles, of which about 80 per cent is cleared land used for farming and grazing. The total population is approximately 200, or 33 per square mile. The soil is sand and gravel over shale and slate. The western half of the area nearest the reservoir is fairly level and the eastern half is rather hilly. Several highways traverse this area and there are approximately 40 houses upon the watershed, which, however, in nearly all cases are located well back from the stream and its tributaries.

About 1 mile above the reservoir is located a farm on which conditions are decidedly unsatisfactory. This farm is known as the Shufelt place and is occupied by a tenant. At this plant a pig house is located 15 feet from the water's edge of the branch of the stream and the hog yard extends across the stream, allowing every opportunity for the hogs to wallow in the stream. There are also two barns at this place comparatively close to the stream. At one of these barns a manure pile is located about 30 feet from the edge of the stream. With this exception there seems to be no other serious condition upon the watershed, although as this is a farming region there must be considerable wash from the farm lands and indirect animal pollution at times of rainfall. At a farm near the eastern boundary of the watershed there is a privy near a tributary stream. The barn at this farm is also so located that drainage from the manure pile reaches the stream.

In 1915, at the time the preliminary draft of the proposed rules and regulations was transmitted to the local authorities, it was recommended that, in view of the frequent high and objectionable turbidity of the supply and the always present opportunity for accidental or wilful contamination, it would be advisable for the village authorities to consider the installation of some form of water purification and that before such steps were taken the services of a competent engineer should be retained to advise more fully in the matter.

In general, the recommendations made in 1912 have been carried out, although the village has failed to request the enactment of the rules and regulations and no steps have been taken to install a purification plant.

At the time of the recent inspection samples of water were collected from the supply and the results of the analyses of these samples, together with others made in the past by the Division of Laboratories and Research, may be found in the appended table.

The results of these analyses show a water with moderate color and turbidity and one comparatively hard. Figures for nitrogen in its various forms are also moderate and at times rather high, indicating the presence of considerable decomposing and decomposable organic matter. The total bacterial counts are usually high and the presence of organisms of the B. coli type in inoculations as small as 1 c.c. indicate the presence of active and potentially dangerous contamination.

In view of the above facts, the following conclusions may be drawn:

1. That in part the recommendations of this Department have been carried out with respect to the sanitary protection of the water supply of Castleton.

2. That the supply is still open to accidental, incidental or wilful contamination by permanent residents upon the watershed and transient visitors thereto.

3. That the supply is at times somewhat objectionable from an esthetic standpoint, due to the occurrence of considerable turbidity.

I would therefore recommend:

1. That the village authorities take such steps as may be found necessary to place the watershed in as satisfactory sanitary condition as possible.

2. That the village take action to install a modern filtration plant supplemented by liquid chlorine sterilization.

3. That, pending the installation of a filter plant, liquid chlorine apparatus be installed and properly operated as a temporary safeguard for the sanitary quality of the supply.

4. That the services of a competent engineer be retained to advise definitely as to the most satisfactory type of filter plant to be installed and to prepare plans for such an installation when authorized.

I further recommend that copies of this report be sent to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 14, 1917

REPORT OF WATER ANALYSIS FOR CASTLETON

Source	Reservoir	Tap, public supply	Tap in village "B"	Tap in village "A"
Collected on	8/16/17	8/16/17	9/4/17	9/4/17
Color	20	.....	Tr.	1.5
Odor, hot	2 m.	.....	2 v.	3 v.
Odor, cold	2 m.	.....	none	2 v.
Turbidity	7	.....	0	5
Solids, total	.....	.....	.....	.....
Loss on ignition	.....	.....	.....	.....
Mineral residue	.....	.....	.....	.....
Ammonia, free	.030	.....	.016	.078
Ammonia, albuminoid	.162	.....	.052	.100
Nitrites	.004	.....	.015	Tr.
Nitrates	.4	.....	.4	.3
Oxygen consumed	3.0	.....	.9	1.8
Chlorine	3.0	.....	2.5	2.5
Hardness, total	131.4	.....	125.8	125.8
Alkalinity	116.	.....	116.0	115.0
Bacteria per c.c.	400	250	650	200
B. coli type 10 c.c.	3+0—	3+0—	0+3—	3+0—
B. coli type 1 c.c.	2+1—	1+2—	0+3—	1+2—
B. coli type 1/10 c.c.	0+3—	1+2—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water; 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

CASTLETON (Lathrop Memorial)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of an epidemic of dysentery among the children and attendants of the Lathrop Memorial, a branch of the Albany Orphan Asylum, located at Castleton.

A report was received at the Department on Saturday, August 25, that there were a number of cases of dysentery among the children and attendants at this institution. Mr. Baker, assistant engineer, was detailed to accompany Dr. Godfrey to Castleton on the afternoon of the same date, to make an investigation. Dr. Tracy, health officer at Castleton, accompanied Mr. Baker and Dr. Godfrey on their inspection.

About two weeks prior to the time of the inspection such a disagreeable taste and odor developed in the village water supply at the institution that this supply was abandoned and water was obtained from a spring located on the institution grounds just below the main building. On Tuesday, August 21, the first case of dysentery developed and since that time there have been several other cases, there being in all some 12 cases among adults. This information very strongly pointed to a contamination of the spring supply. Upon further investigation it developed that several families located below the institution also obtained water from this spring. An investigation by Dr. Godfrey showed that 7 out of 11 persons in these families, who had used the water, had been affected with the dysentery. Inquiry by the local health officer from other physicians in the village indicated that there has been no other disturbance throughout the village.

The spring mentioned above consists of a barrel sunk into the ground near a small brook at a considerably lower elevation than the building of the institution. This barrel is apparently supplied with water by a pipe entering it near the bottom. The water rises to an elevation of about 1 foot above the surface of the ground where it overflows into a second barrel. About 150 feet above the barrel and on the same side of the hill which slopes toward the brook, is located a masonry well or spring. A caretaker at the institution stated that the pipe supplying the barrel was connected with this well or spring. About 10 feet from this spring is a brick cesspool. Inquiry at the institution as to the method of sewage disposal indicated, however, that no sewage was discharging into this cesspool; it being stated that the sewage from the main building discharged without purification, into a swamp adjacent to the river, that sewage from a cottage located nearby discharged into another cesspool about 200 feet above and that the sewage from toilets in the barn discharged into an open drain or brook at a point about 250 feet above the spring. Upon opening the old cesspool, however, it was found that water was entering it through a 5-inch sewer pipe. The flow soon ceased. This led to a further investigation and by placing blueing in the toilets at the barn and flushing them the fact was soon established that the sewage from these toilets discharged directly into this cesspool. The water or sewage disappeared from the cesspool almost immediately, seeping into the sandy bottom on the side of the cesspool nearest the spring. The majority of the sewage, however, broke out of the ground into an open drain just below the cesspool which flows into the brook near which the spring is located. It seems very apparent from the above, therefore, that the spring had become contaminated from the nearby cesspool.

Blueing was later placed in the spring with the assumption that it would appear in the barrel from which the water was obtained. No color, however, can be traced in this water within an hour after the blueing had been applied to the spring and that no color appeared later is indicated by inquiry made of the institutional authorities. It is probable, however, that the pipe leading from the spring to the barrel from which the water was obtained, had become partly filled, or that the bottom part of the spring is filled with sand, so that the pipe is located below the sand and that the water reaches the barrel by filtration through this sand. It is possible that the water is also collected

into the barrel from other sources and that the strength of the blueing was not sufficient to be noticed in the water. In any event, the insanitary conditions in the vicinity would indicate the contamination of the spring supply, and as pointed out above the epidemiological results point strongly to this water as the source of infection.

Water is also at times obtained from a well located in the barn-yard. This water, however, had not been used until two or three days prior to the time of the inspection. The soil pipe from the plumbing fixtures in the barn enters the ground about 10 or 12 feet from the well. The well is provided with only a wooden cover which is not water-tight and is not adequately protected from surface wash.

Samples of water were collected from the spring and the well at the barn at the time of the inspection and sent to the Division of Laboratories and Research for analysis, the results of which together with those samples of the village supply collected on August 16 are recorded in the appended table.

The chemical results of the analyses of the sample collected from the spring show high figures for nitrates and chlorine, thus indicating that pollution finds its way into the supply, while the bacterial results show high counts with colon bacilli present in all dilutions, thus indicating gross contamination of an active and potentially dangerous character. The bacterial counts of the sample collected from the well also show high bacterial counts with colon bacilli present in all dilutions. Results of analyses of the village supply show figures for nitrates and chlorine somewhat above normal. The bacterial counts are rather high and colon bacilli were present in all of the 10 c.c. inoculations of each of the samples collected, in two of the three 1 c.c. inoculations of the sample from the reservoir and in one of each of the 1 c.c., and 1/10 c.c. inoculations of the sample collected from a tap, thus indicating also the presence of some active contamination in the village supply. It should be pointed out, however, that the public water supply of the village is obtained from a surface stream, and that the high bacterial count and presence of colon bacilli are not nearly so significant as in the case of the ground water supply.

As a result of this investigation it may be concluded:

1. That, although the public water supply of the village of Castleton is not above suspicion, it is evident from the epidemiological record, from the insanitary conditions surrounding the spring and also from the analytical results, that the spring at the institution was the source of infection causing the epidemic.
2. That the well supply at the institution is also contaminated.
3. That the methods of sewage disposal at the institution are unsatisfactory and constitute a menace to the health of the inhabitants.

In view of the above I beg to offer the following recommendations to be acted upon by the institutional authorities.

1. That the spring and well be abandoned and that they be closed so that water for potable purposes cannot be obtained from them.
2. That if the village does not improve their present supply the institutional authorities take steps to develop a supply of their own from a source free from contamination.
3. That the services of a competent sanitary engineer be employed to study the sewerage conditions at the institution and advise the institutional authorities as to a proper and adequate method of sewage disposal.

Finally, I would recommend that copies of this report be transmitted to the sanitary supervisor of the district, the local health officer, the superintendent of the Albany Orphan Asylum and to the matron of Lathrop Memorial.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 31, 1917

REPORT OF WATER ANALYSIS FOR CASTLETON

Source	Lathrop Memorial spring	Lathrop Memorial well	Public supply, reservoir	Tap
Collected on	8/25/17	8/25/17	8/16/17	8/16/17
Color	0	.....	20	.....
Odor, hot	2 a.	.....	2 m.	.....
Odor, cold	2 a.	.....	2 m.	.....
Turbidity	0	.....	7	.....
Solids, total	.....	.....	.....	.....
Loss on ignition	.....	.....	.....	.....
Mineral residue	.....	.....	.....	.....
Ammonia, free	.006	.....	.030	.....
Ammonia, albuminoid	.032	.....	.162	.....
Nitrites	0	.....	.004	.....
Nitrates	4.8	.....	.400	.....
Oxygen consumed	1.2	.....	3.0	.....
Chlorine	41.0	.....	3.0	.....
Hardness, total	157.2	.....	131.4	.....
Alkalinity	88.0	.....	116.0	.....
Bacteria per c.c	1,000	2,100	400	250
B. coli type, 10 c.c.	3+0—	3+0—	3+0—	3+0—
B. coli type, 1 c.c.	3+0—	3+0—	2+1—	1+2—
B. coli type, 1/10 c.c.	3+0—	3+0—	0+3—	1+2—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water; 0, none; 1, very faint; 2, faint; 3, distinct; 4 decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

CENTRAL BRIDGE

HERMANN M. BIGGS, M. D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of the village of Central Bridge, Schoharie county. An investigation of this supply was made on November 21, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by W. D. Becker, treasurer of the water company, and Dr. O. A. Snyder, health officer.

Central Bridge is an unincorporated village in the town of Schoharie and is in the northern part of Schoharie county, about 30 miles west of Albany. It is on the D. & H. railroad and Cobleskill creek, a tributary to Schoharie creek. The population at the time of the inspection was estimated at about 400.

There are no public or private sewers in the village. Excretal and other wastes are taken care of in cesspools, septic tanks and privies.

The water supply is owned by the Central Bridge Water Company of which Mr. W. B. Collyer is president and Mr. J. W. Wessell is superintendent. The waterworks were designed by Mr. F. Roundy, civil engineer of Oneonta, and were constructed by day labor under his direction about 1896.

The water supply is obtained from a small brook tributary to Cobleskill creek, the intake being about 2 miles west of the village. The water is collected in a reservoir formed by the construction of a small dam across the brook and conveyed through a pipe line to another reservoir about one-half mile nearer the village, constructed by a small amount of excavations and fill making a small dam around the lower side of the reservoir. From the lower reservoir the water flows by gravity through the pipe line to the village.

There are about 3 miles of water mains varying from 4 to 6 inches in diameter. A reducer on the main line reduces the pressure to about 90 pounds per square inch. There are 11 hydrants placed in various parts of the village for fire protection. There are about 100 houses in the village of which 52 are connected to the water supply. About 200 of the inhabitants

are served with this water and the average daily consumption was estimated to be about 20,000 gallons.

The upper reservoir is said to be about 7 acres in area and to have an average depth of 4½ feet and a capacity of about 10,000,000 gallons. The lower reservoir is constructed on a comparatively level tract of land east of the brook and about one-half mile from the upper reservoir. It is said to be about 8 acres in area and have an average depth of about 4½ feet and a capacity of about 11,000,000 gallons. The upper reservoir has a watershed of about 90 acres and the lower reservoir a watershed of about 20 acres. At the upper end of the upper reservoir there is a swamp of considerable area.

There is one house upon each watershed with a total population of about 6 corresponding to a population per square mile of about 30. The houses are well removed from the watercourses and it is not probable that any direct pollution is received from them. The land adjacent to the reservoir is, however, used for pasture and some pollution may be received from this source.

At the time of the inspection a sample of the water was obtained from a tap in the village and the results of the analysis of this sample together with others previously made by the Division of Laboratories and Research will be found in the appended table.

From the results of these analyses it will be seen that the water is colored, turbid at times and hard. The figures for free ammonia are apparently high at times and these results together with the high figures for albuminoid ammonia and oxygen consumed probably indicate the presence of vegetable organic matter from the swamps. The figures for chlorine at times are somewhat above normal for this section of the country, due probably to the pasturing of cattle upon the watershed. The results of the bacterial analyses show the total counts to be moderate, although organisms of the B. Coli group have been found in 10 c.c. inoculations in 50 per cent of the analyses made.

As a result of this investigation and of the analyses the following conclusions may be made:

1. That the water supply of Central Bridge is subject to incidental, accidental or wilful pollution from persons passing over the watershed and from the cattle pasturing upon the watershed.
2. That the physical quality of the supply is somewhat unsatisfactory due to its rather high color and the occasional turbidity after heavy rains.

In view of the above conclusions, I would make the following recommendations:

1. That the Central Bridge Water Company endeavor to maintain the supply and its sources free from possibility of contamination.
2. That cattle be excluded from access to the reservoirs or their immediate vicinity.
3. That proper signs be posted around the reservoirs warning against pollution of the water thereof.

Should it be desired to improve the physical quality of the supply and at the same time secure better protection of its sanitary quality it might be found advisable to install, under competent engineering advice, a filtration plant of proper design and construction.

In conclusion I would recommend that copies of this report be transmitted to the Central Bridge Water Company, to the health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 21, 1917

REPORT OF WATER ANALYSIS FOR CENTRAL BRIDGE

Source	Tap in village	Tap in village	Tap in village	Tap in village	Tap in village	Tap in village
Collected on	2/13/11	4/4/11	5/4/11	10/9/11	12/20/11	11/21/16
Color	20	30	20	15	15	8
Odor, hot	.....	.....	.....	.....	.....	1 v.
Odor, cold	.....	.....	.....	.....	.....	1 v.
Turbidity	5	5	10	1	1	5
Solids, total	174	107	120	135	142	.....
Loss on ignition	.....	.....	.....	.....	.....	.....
Mineral residue	144	73	84	103	121	.....
Ammonia, free	.072	.066	.026	.010	.018	.002
Ammonia, albuminoid	.256	.220	.248	.120	.220	.208
Nitrites	.002	.005	.002	.001	.001	.003
Nitrates	.10	.20	.40	.04	.08	.14
Oxygen consumed	1.62	7.80	4.40	4.80	5.81	9.10
Chlorine	1.62	1.50	1.25	1.00	2.00	1.00
Hardness, total	142.8	71.4	65.7	100.0	92.9	122.8
Alkalinity	138.0	70.0	63.0	93.0	91.0	93.0
Bacteria per c.c	150	130	60	60	90	140
B. coli type... 10 c.c.	+	—	—	—	+	3+0—
B. coli type... 1 c.c.	—	—	—	—	—	1+2—
B. coli type... 1/10 c.c.	—	—	—	—	—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water; 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

CHAFFEE

HERMANN M. BIGGS, M. D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Chaffee made by Mr. C. M. Baker, assistant engineer, on September 6, 1917.

Chaffee is an unincorporated village of about 150 inhabitants, located in the southeastern corner of Erie county on the Olean-Buffalo Division of the Pennsylvania railroad, about 33 miles southeast of Buffalo. No sewer system is provided in the village, the houses being served by privies, cesspools, etc.

The water supply is owned and operated by the Chaffee Water Works Company of which Mr. A. J. Odell is president and Mr. J. C. Carlin superintendent. The supply was first put into operation in 1897 or 1898 and is derived from wells located in the village from which the water is pumped through the distribution system into a standpipe. Since the original installation a second well has been constructed and the original storage tank which was constructed of wood has been replaced by a steel standpipe.

About 90 per cent of the population is served with the water, there being in all about three-fourths of a mile of mains ranging in size from 2 inches to 4 inches in diameter. The pressure is approximately 25 pounds per square inch. No hydrants are provided, however, for fire protection. Definite information regarding the amount of water used could not be obtained at the time of the inspection.

The present standpipe is constructed of steel, is 8 feet in diameter by 45 feet high and has a capacity of about 17,000 gallons. It is located in the center of the village. The pumping equipment consists of plunger pumps and gasoline engines located at each of the wells, the pumps having capacities of 50 or 60 gallons per minute. One engine is a 3½-horse power gasoline engine while the other is a 4½-horse power gasoline engine.

The wells, two in number, from which the supply is derived are located in the southwestern portion of the village. They consist of 3-inch casings driven through gravel to depths of 21 and 28 feet respectively. A privy, barn and manure pile are located about 50 feet from the easterly or old well. There are also some 5 houses 100 to 500 feet distant and probably 7 or 8 houses 500 to 1,000 feet distant. There appears, however, to be no opportunity for pollution by surface wash. A privy and house are located about 150 feet from the westerly or "new" well, there being 4 or 5 houses 100 to 500 feet distant and 6 or 7 houses 500 to 1,000 feet distant.

Due to the lack of containers, samples of the water could not be collected at the time of the inspection. Later, however, samples were collected by the health officer and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but a water high in hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are moderate but those for nitrates and chlorine are at times high. The bacterial counts are at times high which may be due in part at least to delays in transit, because of uncertain express connections between the village and the laboratory. Colon bacilli have in no case been found present. The high nitrates and chlorine indicate that pollution finds its way into the ground water tributary to the supply, but the absence of colon bacilli indicates that this pollution has been rendered inactive by the natural processes of purification. This pollution is probably caused by the privies and insanitary conditions in the vicinity of the wells and it is quite possible, that under different hydrostatic conditions of the ground water active contamination from the sources might find its way into the supply.

As a result of this investigation, it may be concluded that the water supply of Chaffee is derived from wells, which, although not actively contaminated at the time of the inspection, are located in close proximity to privies and buildings from which active contamination might reach the supply.

In view of the above, I beg to recommend that all privies and cesspools within 500 feet of the wells be provided with watertight containers and the contents from them be properly disposed of at regular intervals and that satisfactory sanitary conditions be maintained in the vicinity of the wells.

Finally I would recommend that copies of this report be sent to the water company, to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 18, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Chaffee	Erie	Tap, public supply	2/28/12	Tr.	Cl.			112		81	.016	.026	.001	2.00	0.10	1.50	68.6	60.0	20	−	−	−
Chaffee	Erie	Tap, public supply	4/11/12	Tr.	Cl.			110		88	.010	.018	.001	0.80	0.20	2.00	72.9	59.0	120	−	−	−
Chaffee	Erie	Tap, public supply	9/26/12	Tr.	Cl.			164		127	.002	.002	.001	3.00	0.20	1.50	114.2	103.0	1,000	−	−	−
Chaffee	Erie	Tap, public supply	11/15/12	Tr.	Cl.			184		160	.034	.012	.001	2.60	0.50	1.25	157.2	133.0	1,900	−	−	−
Chaffee	Erie	Tap, public supply	12/19/12	Tr.	Cl.			98		84	.040	.038	Tr.	1.20	0.10	1.50	77.1	70.0	350	−	−	−
Chaffee	Erie	Tap, public sypply	1/30/13	5	Cl.			177			.092	.032	.001	3.60	1.20	4.75	111.4	103.0	20	−	−	−
Chaffee	Erie	Tap, public supply	2/26/13	Tr.	Cl.			252			.044	.026	Tr.	5.00	0.30	5.75	182.8	149.0	10	−	−	−
Chaffee	Erie	Tap, public supply	4/10/13	5	Tr.			117			.014	.016	Tr.	1.50	0.30	1.25	84.3	730.0	230	−	−	−
Chaffee	Erie	Tap, public supply	5/29/13	Tr.	Tr.			142			.004	.001	Tr.	2.00	0.20	1.50	87.0	82.0	.....	−	−	−
Chaffee	Erie	Tap, public supply	7/16/13	Tr.	Cl.			193			.004	.004	.001	3.00	0.50	2.50	137.2	122.0	.....	−	−	−
Chaffee	Erie	Old well	9/27/17	0	0	1 m.	2 m.				.002	.002	0	1.60	0.10	2.75	137.2	133.0	.....	0+3−	0+3−	0+3−
Chaffee	Erie	New well	9/25/17	0	0	1 m.	2 m.				.002	.002	0	1.60	0.10	2.75	137.2	134.0	.....	0+3−	0+3−	0+3−

CHATEAUGAY

HERMANN M. BIGGS, M. D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of the village of Chateaugay made on May 3, 1917, by Mr. M. F. Sanborn, assistant engineer in this Department, who was assisted by Olin Johnson, superintendent and Dr. L. P. Sprague, health officer.

Chateaugay is an incorporated village with a population of about 1,100, located in the northeastern part of Franklin county on the Rutland railroad and the Chateaugay river. About 90 per cent of the houses are connected with private or public sewers discharging into the Chateaugay river, the remaining houses are served by privies and cesspools.

The public water supply is derived from a large spring located about 1½ miles southeast of the village. The waterworks are owned and operated by the Chateaugay Water Works Company, which designed and constructed the water system in 1876.

Practically the entire population of the village is served by this supply with a daily consumption of approximately 110,000 gallons. There are approximately 250 service taps, none of which are metered. The supply is distributed by gravity with an average pressure in the village of about 60 pounds per square inch.

The spring from which the supply is obtained was developed by the construction of a concrete basin at the foot of a rocky cliff at the point where the spring was found to issue. The basin surrounding this spring is approximately 30 by 86 feet in plan with a depth ranging from 3 to 5 feet and a capacity of approximately 77,000 gallons. The entire basin is covered by a frame roof.

Near the spring is a brook which makes an abrupt turn and steep fall just above the spring. It is possible that the water from the spring has in part its original source from this brook. The brook itself flows through a pasture land but is otherwise subject to only a small amount of pollution by surface wash.

At the time of the inspection a sample of water was collected from a tap in the village and the results of the analysis of this sample together with others made in the past by the Division of Laboratories and Research will be found in the appended table.

The results of these analyses show a water clear, colorless and moderately soft. The figures for nitrogen in its various forms are low, indicating the presence of a moderate amount only of decomposing or decomposable organic matter. The bacterial counts are comparatively low and organisms of the B .Coli type have been found only occasionally in 10 c.c. inoculations.

In view of the above facts the following conclusions may be drawn:

1. That the public water supply of Chateaugay is derived from a spring which, if at all times properly protected from contamination, should furnish a supply of satisfactory physical and sanitary quality.
2. That there is some possibility of the water from this spring having its source originally from the nearby brook which is to some extent polluted by drainage from pasture land.

In view of the above conclusions the following recommendations may be made:

1. That the Chateaugay Water Company take every precaution to maintain the spring and its surroundings in a proper sanitary condition.
2. That, in view of the possibility of the brook near the springs being an original source of the supply, the watershed of this brook above the springs be maintained in a sanitary condition.

I would further recommend that copies of this report be sent to the Chateaugay Water Company, to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July* 27, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Chateaugay	Franklin	Tap, public supply	3/10/11	Tr.	Cl.			110		86	.012	.022	.002	2.40	0.70	1.50	80.0	78.0	20	−	−	−
Chateaugay	Franklin	Tap, public supply	10/ 7/11	Tr.	Cl.			136		110	.006	.020	.001	1.20	0.30	0.75	84.0	75.0	140	−	+	−
Chateaugay	Franklin	Tap, public supply	11/14/11	Tr.	Cl.			121		89	.008	.008	.001	1.80	0.20	1.50	80.0	76.0	20	−	−	−
Chateaugay	Franklin	Tap, public supply	1/ 6/12	Tr.	Cl.			103		77	.010	.012	Tr.	2.00	0.40	2.00	69.0	60.0	60	−	−	−
Chateaugay	Franklin	Tap, public supply	2/ 9/12	Tr.	Cl.			106		96	.016	.036	Tr.	2.40	0.10	2.00	61.0	49.0	28	−	−	−
Chateaugay	Franklin	Tap, public supply	3/14/12	Tr.	Cl.			102		88	.004	.004	Tr.	2.40	0.30	1.25	86.0	77.0	20	−	−	−
Chateaugay	Franklin	Tap, public supply	4/18/12	10	Cl.			84		59	.004	.056	Tr.	1.20	2.10	0.50	49.0	43.0	100	−	−	−
Chateaugay	Franklin	Tap, public supply	9/ 7/12	Tr.	Cl.			136		114	.002	.002	Tr	1.60	0.10	1.75	77.0	67.0	110	−	−	−
Chateaugay	Franklin	Tap, public supply	10/25/12	Tr.	Cl.			130		88	.010	.050	.001	2.00	0.50	1.50	76.0	74.0	300	−	−	−
Chateaugay	Franklin	Tap, public supply	12/ 5/12	Tr.	Tr.			97		74	.006	.030	Tr.	4.00	1.50	1.75	71.0	62.0	100	−	−	−
Chateaugay	Franklin	Tap, public supply	1/ 9/13	Tr.	Cl.			113			.008	.048	.002	2.40	0.50	1.87	73.0	69.0	10	−	−	−
Chateaugay	Franklin	Tap, public supply	2/13/13	Tr.	Cl.			106			.018	.034	Tr.	1.60	0.60	1.50	64.0	41.0	50	−	−	−
Chateaugay	Franklin	Tap, public supply	3/27/13	Tr.	Cl.			126			.014	.034	Tr.	1.70	0.80	1.75	67.0	57.0	160	−	−	−
Chateaugay	Franklin	Tap, public supply	5/ 8/13	Tr.	Cl.			90			.004	.010	.001	1.60	0.10	1.75	69.0	61.0	.....	−	−	−
Chateaugay	Franklin	Tap, public supply	6/19/13	Tr.	Cl.			127			.004	.002	.001	2.20	0.40	1.25	73.0	71.0	80	−	−	−
Chateaugay	Franklin	Tap, public supply	7/24/13	Tr.	Cl.			104			.008	.014	Tr.	2.40	0.20	1.50	80.0	72.0	15	−	−	−
Chateaugay	Franklin	Tap, public supply	5/14/14	Tr.	Tr.			101		82	.004	.014	.001	1.30	1.50	1.50	63.0	56.0	10	−	−	−
Chateaugay	Franklin	Tap, public supply	5/ 3/17	0	Cl.			92			.006	.016	0	0.20	2.50	2.25	31.0	58.0	40	−	−	−

CHERRY VALLEY

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of the village of Cherry Valley made by Mr. E. S. Chase, assistant engineer, on December 15, 1916.

Cherry Valley is an incorporated village of 762 inhabitants, located in the northeastern portion of Otsego county. This village is the terminus of the Sharon Springs and Cherry Valley branch of the Delaware and Hudson railroad and is surrounded by a prosperous farming section. The village is mainly residential and serves as a trading center for the surrounding country. There is no public system of sewers in the village, the houses being served by privies and cesspools.

The public water supply is derived from a small stream impounded in a storage and distributing reservoir about 1 mile east of the village center. The waterworks were installed in 1896 and constructed by contract under the direction of the engineer, Mr. J. W. Lamb of Cooperstown. Shortly after the construction of the main reservoir a smaller reservoir was constructed which serves to collect the water from a small surface watershed and from springs, this reservoir serving as an auxiliary supply at times when it is necessary to clean the main reservoir. About three years ago a 30-inch mud pipe was placed through the dam of the main reservoir in order to allow opportunity for thoroughly cleaning the reservoir when necessary, otherwise there has been no change in the system. The waterworks are owned and operated by the municipality under the direction of the board of water commissioners of which Mr. Seth Pearson is president and Mr. G. A. Walton is superintendent.

Practically the entire population of the village is served by the supply, as well as the railroad. No information is available regarding water consumption as there are no meters or other methods for measuring the amount of water used, but assuming a rate of 100 gallons per capita the consumption may approximate 80,000 gallons per day. There are between 4 and 5 miles of water mains ranging in size from 2 to 10 inches in diameter and the pressure in the village is between 80 and 90 pounds per square inch. There are about 200 service taps.

The main reservoir is two or three acres in area and 16 feet deep and has a capacity of approximately 13,000,000 gallons. It is formed by an earthen dam with masonry core wall constructed across the bed of the brook. The intake consists of a 10-inch pipe connected to the main supply line to the village by a swivel joint, the end of the intake being maintained at a point about 3 feet below the surface of the reservoir by means of a float constructed of barrels.

Since the installation of the mud pipe the reservoir has been cleaned about once a year. The water mains are flushed 5 or 6 times a year. The village owns about 10 acres of land in the immediate vicinity of the reservoir. The small reservoir is about one-half acre in area and has a maximum depth of about 10 feet. Its capacity may be estimated at about 2,000,000 gallons. The watershed tributary to it is only a few acres in area and free from permanent sources of contamination.

The watershed above the reservoir is approximately 2 4 square miles in area. It consists mainly of the fairly steep side slopes of the hills forming the valley. The soil is loamy gravel overlying rock strata of limestone. The majority of the area is cleared land devoted to agriculture. There are 8 occupied dwellings upon the watershed and the population may be estimated at about 30, or 12 per square mile. In the majority of cases the houses and farm buildings are fairly remote from the stream or its tributaries. At the Yerdon place, however, about 1½ miles above the reservoir, the house, barn and privy are within 100 feet of the stream. On the whole, however, the contamination which reaches the stream is probably of animal rather than human origin and is from surface wash from the barn yards, pastures and

cultivated fields. The watershed is protected by rules and regulations enacted by this Department in 1897. The village authorities have taken steps to enforce these rules and regulations and at the Yerdon place have succeeded in having the privy relocated and general conditions improved somewhat. Ice cutting upon the reservoir is carried on to some extent during the winter under the supervision of the water commissioners. .

In 1908 an investigation was made by this division into the matter of tastes and odors which had developed in the supply. As a result of this investigation it was recommended that the mains be flushed to remove accumulated sediment and that the reservoir be thoroughly cleaned. These recommendations have been carried out by the village authorities.

At the time of the inspection samples of the water were collected, and the results of the analyses of these samples together with others made in the past by the Division of Laboratories and Research will be found in the appended table.

These analyses show a water at times colored and turbid. The figures for nitrogen in its various forms are moderately high showing the presence of decomposing and decomposable organic matter. The figures for chlorine are somewhat above normal for unpolluted waters in this region. The water is rather hard, due probably to the calcareous nature of the soil and underlying rock. The total bacterial counts are high and organisms of the B. coli type are comparatively prevalent, being found in inoculations as small as 1 c.c. The high bacterial count and the prevalence of B. coli indicate active contamination of human or animal origin.

In view of the above facts the following conclusions may be drawn:

1. That the public water supply of the village of Cherry Valley is derived from a source subject to considerable indirect contamination from highways, pasture lands, cultivated fields, barn-yards and houses located upon the watershed.

2. That there was no evidence at the time of the inspection of direct contamination of human origin, although it is evident that such contamination of an accidental, incidental or wilful nature may be brought about by the permanent residents upon the watershed or transient visitors thereto, or by men engaged in ice cutting operations during the winter.

3. That, while the storage afforded by the impounding reservoir brings about a certain degree of purification and while the rules and regulations if rigorously enforced will minimize the danger of contamination, it is evident that the supply can be made safe at all times and under all conditions only by means of adequate purification.

In view of the above the following recommendations may be made:

1. That the village authorities continue to enforce rules and regulations enacted by this Department in order to minimize the number of opportunities for contamination.

2. That ice cutting upon the reservoir be abandoned.

3. That the village authorities give immediate consideration to the installation of a modern purification plant after the design and under the supervision of a competent engineer.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 4, 1917

REPORT OF WATER ANALYSIS FOR CHERRY VALLEY

Source	Tap, public supply	Tap, public supply	Tap, public supply
Collected on	8/12/18	11/23/16	12/15/16
Color	20	.....	5
Odor, hot	.....	.....	1 v.
Odor, cold	.....	.....	1 v.
Turbidity	2	.....	20
Solids, total	.....	.....	.....
Loss on ignition	.....	.....	.....
Mineral residue	.....	.....	.....
Ammonia, free	.138	.....	.002
Ammonia, albuminoid	.178	.....	.036
Nitrites	Tr.	.....	.003
Nitrates	0.04	.....	0.24
Oxygen consumed	4.50	.....	3.80
Chlorine	0.38	.....	1.00
Hardness, total	117.0	.....	77.1
Alkalinity	104.0	.....	74.0
Bacteria per c.c.	500	130	750
B. coli type 10 c.c.	—	+	3+0—
B. coli type 1 c.c.	—	+	1+2—
B. coli type 1/10 c.c.	—	—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

CHESTER

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an inspection of the public water supply of the village of Chester made on July 11, 1917, by Mr. E. S. Chase, assistant engineer in this Department.

Chester is an incorporated village with a population of about 1,280, located in the central part of Orange county on the main line of the Erie railroad about 60 miles northwest of the city of New York. There are practically no industries in the village, it being the trading center for an agricultural section. There is no public system of sewers in the village, the houses being served by privies and cesspools.

The public water supply is derived from Walton lake, located about 5 miles southeast of the village. The waterworks were installed in 1892 after the designs of Mr. J. B. Rider, civil engineer of New York city. The supply is delivered to the village by gravity and is unpurified. The waterworks are in charge of the board of trustees of which Mr. J. S. Murray is president.

Practically the entire population of the village is supplied from the public water supply and numerous individual farm houses outside of the village limits are also served. No data are available regarding the water consumption but based upon a per capita rate of 100 gallons daily, it is reasonable to assume that the consumption approaches 130,000 gallons daily. Considerable water is also used by the railroad. There are 8 miles of water mains ranging from 4 to 12 inches in diameter, 5 miles of main being the line leading from the lake to the village. The average pressure in the village ranges from 60 to 90 pounds per square inch. Practically none of the services are metered.

The intake at Walton lake consists of a 12-inch pipe terminating at a point roughly estimated to be 500 feet from the northwestern shore of the lake and at a depth of 9 feet. The end of this pipe is said to be protected by a timber crib. From the intake the water flows through a gate chamber located on the shore of the lake.

The lake is 127 acres in area and has an estimated capacity of approximately 300,000,000 gallons. The elevation of the lake was raised about 3.5

feet by the construction of a small dam across the outlet. The present high water mark of the lake is practically 250 feet above the center of the village.

Walton lake has a surface watershed, including the area of the lake, of approximately 1.12 square miles. Most of this area consists of moderately steep slopes leading directly to the shores of the lake. The area east of the lake is largely covered with timber while the western slopes are cleared land. Some 50 summer cottages and 4 or 5 permanent farm houses are located around the lake, most of them being at distances fairly remote from the lake. The total permanent population may be considered as about 25, or about 22 per square mile, while in summer this population probably reaches 250, or 220 per square mile. At the northern end of the lake is a summer hotel which has a capacity for 35 or 40 guests. No information could be obtained as to the exact location of the cesspool which is said to receive the sewage from the hotel. No evidence of sewage overflow, however, was noted at the time of the inspection. At this hotel a small frame building is constructed on the shore of the lake directly over the water. This building is used for sleeping quarters for three of the employees. No toilet facilities, however, are provided. At the southwest end of the lake there is a schoolhouse at which two privies are located with loosely stoned up vaults about 40 feet from a small watercourse leading into the lake and also about 90 feet from the lake itself. The lake is used to a considerable extent for boating and bathing purposes. Rules and regulations for the sanitary protection of this supply were enacted by this Department in 1906. The practice of bathing in the waters of the lake is forbidden by these rules but upon an attempt by the village authorities to stop this practice a court decision prevented the enforcement without compensation by the village for the damages incurred. The privies at the school as located also constitute a violation of the rules.

Subsequent to the time of the inspection, samples of water were collected by Dr. W. W. Davis, health officer, and the results of the analyses of these samples together with others made in the past by the Division of Laboratories and Research will be found in the appended table.

The results of these analyses show a water slightly colored, usually clear and comparatively soft. The figures for nitrogen in its various forms are moderately low and are consistent with the character of the watershed. The total bacterial counts are usually somewhat high and the occurrence at times of organisms of the B. coli type indicates the presence of active contamination of animal or human origin.

In view of the above facts the following conclusions may be drawn:

1. That the public water supply of Chester is derived from a source which is comparatively free from permanent sources of contamination.
2. That the supply is, however, open to direct contamination during the summer time due to the use of the lake for boating, bathing and other pleasure purposes.
3. That the use of the lake and its shores as a summer resort renders very probable contamination and possible infection of the supply during the summer.

I would therefore recommend:

1. That the village authorities continue to maintain the sanitary surroundings of the lake in as satisfactory condition as possible in order to minimize the dangers of contamination from permanent sources.
2. That in order to prevent accidental, incidental or wilful contamination of the supply during the summer the village install and properly operate, at least during the summer, suitable apparatus for the sterilization of the supply with liquid chlorine.

I would further recommend that copies of this report be transmitted to the local health officer, to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 20, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Chester	Orange	Tap, public supply	1/30/13	8	Tr.	....	....	38	....	....	.016	.072	.001	0.04	2.10	2.00	16.9	14.0	40	—	—	—
Chester	Orange	Tap, public supply	3/12/13	5	Tr.	....	....	31	....	....	.005	.074	Tr.	0.04	2.00	2.00	19.5	12.0	5	—	—	—
Chester	Orange	Tap, public supply	4/17/13	5	Cl.	....	....	39	....	....	.026	.084	Tr.	0.05	1.80	2.00	24.7	10.0	400	—	—	—
Chester	Orange	Tap, public supply	5/28/13	Tr.	Cl.	....	....	42	....	....	.003	.008	.004	0.04	2.50	2.00	18.2	9.0	150	—	—	—
Chester	Orange	Tap, public supply	7/ 9/13	5	Tr.	....	....	39	....	....	.004	.108	.002	0.06	1.50	1.75	16.9	11.0	.....	+	—	—
Chester	Orange	Tap, public supply	3/24/14	Tr.	Cl.	....	....	35	....	....	.028	.096	.001	0.03	2.50	1.75	18.2	10.0	170	—	—	—
Chester	Orange	Tap, public supply	4/29/15	5	3	2 a.	2 a.	38	....	....	.008	.076	.001	0.02	3.00	2.00	20.8	11.0	20	+	—	—
Chester	Orange	Tap, public supply	4/29/15	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	40	—	—	—
Chester	Orange	Tap, public supply	7/30/15	Tr.	Tr.	3 v.	3 v.	53	....	....	.014	.100	.004	0.02	2.80	2.25	24.7	11.0	1,500	—	—	—
Chester	Orange	Tap, public supply	10/30/16	5	Tr.	2 v.	2 v.	....	....	....	.002	.102	Tr.	0.02	2.20	1.63	20.8	13.0	60	+	—	—
Chester	Orange	Tap, public supply	7/13/17	0	Tr.	0	0	....	....	....	.010	.106	0	0.02	1.80	2.75	22.1	19.0	*22,000	—	—	—

* Samples three days in transit.

CLAYVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Clayville, made by Mr. C. M. Baker, assistant engineer, on July 25, 1917.

Clayville is an incorporated village of 972 inhabitants, located in Oneida county, on the Utica branch of the Delaware, Lackawanna and Western railroad, about 11 miles south of the city of Utica. The village is on the Sauquoit creek. Several private sewer systems have been constructed in the village, some of which are provided with septic tanks for treatment of the sewage, while others discharge directly into the creek without purification. Some 25 houses are served by these sewers. The principal industry in the village is that of the Clayville Knitting Company.

The supply is owned and controlled by the Clayville Knitting Company, and is not regularly used as a public supply. The company supplies its own tenant houses and some others with the water without charge. The water is not generally used for potable purposes, notices being posted in the tenant houses not to drink the water, nevertheless it is probably used for domestic purposes at times. Hydrants are located on the system near the property of the company only. The supply is derived from a small impounding reservoir in the bed of a small brook about one-half mile west of the village. It was first put into operation in 1908 or 1909, and since its original installation the only improvements have consisted of extensions to this system. Possibly 50 per cent of the total population of the village is served with the water, there being in all 108 families, 5 stores, 1 postoffice and 1 hotel supplied with the water. The distribution system consists of about 1 mile of mains, ranging in size from 6 inches to 8 inches in diameter. The pressure in the main section of the village is about 84 pounds per square inch. Due to the lack of meters or other method of measuring the water used no definite information could be obtained regarding the consumption. The majority of the water, however, is probably used for milling purposes.

A cross connection equipped with a single check valve and a gate valve is provided between the regular supply and an auxiliary fire supply of the knitting company whereby water may be pumped from Sauquoit creek into the distribution system.

The reservoir is formed by an earthen dam constructed across the channel of the stream and has a capacity of about 2,000,000 gallons. From the reservoir the water is first received in a settling basin about 10 feet by 5 feet in plan, and 5 feet deep. From this settling basin the water flows by gravity through the distribution system.

The watershed tributary to the supply is about .65 square miles in area and has a total population of 15 persons or an equivalent of 23 per square mile. This area is used mostly for pasture land, and the slopes are somewhat precipitous. Two of the three groups of farm buildings located on the watershed are well back from the stream. The upper end of the stream, however, flows along a road gutter for a short distance, the third group of farm buildings being located directly across the road. A private fishing pond tributary to the stream is maintained on the watershed.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity at the time the samples were collected, but it is probable that at times of heavy rainfall the water is turbid. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are moderate, but those for nitrates and chlorine appear to be above normal. The bacterial count was high and colon bacilli were present in the 10 c.c. inoculations, thus indicating the presence of a moderate amount of active contamination. The water is very hard.

As a result of this investigation it may be concluded:

1. That the water supply furnished by the Clayville Knitting Company, to its tenants and other residents of the village of Clayville, is derived from a source which is subject to pollution from inhabitants and trespassers on the watershed.

2. That although notices are posted regarding the use of this supply for drinking purposes, it is undoubtedly so used to a considerable extent.

In view of the above, I beg to offer the following recommendation to be acted upon by the Clayville Knitting Company:

1. That if the present water supply is to be used for domestic or potable purposes:

   a. Adequate purification be provided.

   b. Pending the installation of a purification plant apparatus be provided and the supply be sterilized with liquid chlorine.

Finally, I would recommend that copies of this report be transmitted to the Clayville Knitting Company, to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 21, 1917

REPORT OF WATER ANALYSIS FOR CLAYVILLE

Source	Tap, Knitting Co., at Clayville
Collected on	7/25/17
Color	5
Odor, hot	2 g
Odor, cold	2 a.
Turbidity	0
Solids, total	.....
Loss on ignition	.....
Mineral residue	.....
Ammonia, free	.004
Ammonia, albuminoid	.024
Nitrites	.005
Nitrates	.2
Oxygen consumed	2.3
Chlorine	1.75
Hardness, total	188.4
Alkalinity	185.0
Bacteria per c.c.	13,600
B. coli type 10 c.c.	3+0—
B. coli type 1 c.c.	0+3—
B. coli type 1/10 c.c.	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

CLINTON (Hamilton College)

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on the public water supply of Hamilton College and vicinity, town of Kirkland, Oneida county. An investigation of this supply was made on May 8, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. R. B. Dudley, health officer of the town of Kirkland.

Hamilton College is located in the town of Kirkland, about 1 mile west of the village of Clinton, and about 10 miles southwest of the city of Utica. Clinton is connected with trolley service to Utica, and the N. Y. O. and W. R. R. passes through the village. The population at the college, during the school year, is about 260, of which about 160 are students. There are also about 25 houses outside of the college, which are served by this supply. This would make a total population of about 400 during the larger part of the year.

The college and neighboring houses are served by a public sewer and disposal plant which is under the jurisdiction of the sewer commissioners of the Hamilton College sewer district, in the town of Kirkland. The disposal plant consists of a screen chamber, an Imhoff tank, and a sludge bed. The effluent from the Imhoff tank is discharged directly into Oriskany creek.

The public water supply is owned by Hamilton College, Dr. M. W. Stryker being president, and Mr. E. A. Conklin, bursar, the latter having charge of the waterworks. The works were designed by Mr. A. M. Scripture, civil engineer, of New Hartford, and were constructed under his direction in 1896.

The water supply is obtained from two reservoirs, located about 2 miles west of the college. These reservoirs are fed largely by springs, although they receive a small amount of surface run-off. The water is delivered by gravity to the college, the average pressure at the college being about 80 pounds per square inch. About 400 people are served by this supply, and the estimated daily consumption varies from about 30,000 to 40,000 gallons. There are about 2 miles of water mains varying from 4 inches to 8 inches in diameter. Hydrants for fire protection are placed in the various parts of the college grounds and the surrounding district.

The two reservoirs are formed by the construction of earthen dams across two natural drainage valleys. The brooks upon which the reservoirs are located are tributary to Oriskany creek. The reservoirs are about 1½ to 2 acres in area, and each contains from 10,000,000 to 15,000,000 gallons of water.

The area of the watershed was estimated to be about one-fifth of a square mile, practically all of which is owned by the college, and the supply is well protected from pollution. There is only one house upon the watershed, and that is about one-fourth of a mile from the reservoir.

At the time of the inspection a small amount of chara and frog spawn were noticed in the shallow parts of the reservoir. The chara, which is a higher type of algae, upon decaying gives off strong hydrogen-sulphide odors. The watershed has a gentle slope and the underlying rock is covered with clay, sand and gravel. The rock stratum of this vicinity is of a limestone formation with some gypsum and comparatively easily eroded. Considerable re-foresting is being carried on by the college and several thousand white pine trees about three years old have been set out upon the watershed.

At the time of the inspection a sample of the water was collected for bacteriological analysis and later a sample was collected for both chemical and bacteriological analyses and the results of these analyses will be found in the appended table.

From the results of these analyses it will be seen that the water is very hard, much of which is of a permanent character, due to the gypsum and limestone of the local rock. The water contains a small amount of color. Nitrogen in its various forms is comparatively low. Oxygen consumed is fairly high and is undoubtedly due to the color in the water. Chlorine, while

fairly high, is undoubtedly due to the character of the local rock, it probably being in the outskirts of the salina group of rock. In the bacterial analysis the total counts of bacteria were moderate and no organisms of the B. coli group were found in the sample tested.

As a result of this investigation and of the analyses the following conclusions may be drawn:

1. That the water is apparently satisfactory from a sanitary standpoint, although quite hard.
2. That the chara and frog spawn found in the shallow parts of the reservoir are objectionable on account of the odors and organic matter which are derived from them.

In view of the results of this investigation I would make the following recommendations:

That any frog spawn occurring in the reservoirs in the spring be removed, and that at no time should the chara be allowed to grow in any large quantities, since it will, upon decaying, give rise to very unpleasant odors and tastes in the water.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 25, 1917

REPORT OF WATER ANALYSES FOR HAMILTON COLLEGE

Source	Tap in Hamilton college, bottle marked "D"	Tap at D. K. E. house
Collected on	7/7/16	12/9/16
Color	.....	5
Odor, hot	.....	1 v.
Odor, cold	.....	1 v.
Turbidity	.....	Tr.
Solids, total	.....	843
Loss on ignition	.....	82
Mineral residue	.....	761
Ammonia, free	.....	Tr.
Ammonia, albuminoid	.....	.012
Nitrites	.....	Tr.
Nitrates	.....	0.24
Oxygen consumed	.....	1.10
Chlorine	.....	5.75
Hardness, total	.....	500.0
Alkalinity	.....	156.0
Bacteria per c.c.	40	80
B. coli type, 10 c.c.	0+3—	0+3—
B. coli type, 1 c.c.	0+3—	0+3—
B. coli type, 1/10 c.c.	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

COHOCTON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Cohocton, made by Mr. C. M. Baker, assistant engineer, on September 4, 1917.

Cohocton is an incorporated village of 958 inhabitants, located in the northern part of Steuben county, on the D. L. & W. railroad and the Rochester branch of the Erie railroad, about 50 miles south of Rochester.

It is on the Cohocton river. No sewers are provided in the village, the houses being served by privies, cesspools, etc.

The water supply is owned by the municipality and controlled by the board of trustees. It is derived from springs located 2 to 2½ miles west of the village and also from wells located in the village. From the springs the water flows by gravity to a storage reservoir located on a hill about 1 mile west of the village, thence to the distribution system. The water is pumped from the wells directly into the distribution system. The supply was first put into service about 1892. Practically all of the inhabitants of the village are served with the water, there being in all some 250 service taps, none of which are metered. The distribution system consists of approximately 6 miles of mains ranging from 4 to 8 inches in diameter. The pressure is approximately 120 pounds per square inch. Due to the lack of meters or other method of measuring the water used, no definite information could be obtained regarding the consumption.

The reservoir is constructed by excavation and embankment, the sides being of rip-rap and the bottom constructed of clay puddle and concrete. It is about 60 feet square by 10 feet deep and has a capacity of approximately 200,000 gallons. It is uncovered but is enclosed by a fence and the embankments prevent any possibility of surface wash.

Power is furnished for pumping from the wells by a 35-horse power steam boiler. Water is raised from the wells by means of air lifts and is thence pumped directly into the distribution system.

There are 5 or 6 springs located from 2 to 2½ miles west of the village. The two springs furthest west appear to be satisfactorily protected from surface wash. The other springs, however, located near small brooks, are protected only by loosely constructed stone walls. They are subject to surface wash at times of high water. The watershed tributary to the stream near which these springs are located is used for farming and agricultural purposes, and although no direct sources of pollution of human origin were observed at the time of the inspection, the stream is subject to considerable pollution from pasture land and cultivated fields.

The wells, three in number, are located within the village and are 3½ inches in diameter. Two of these wells are drilled to a depth of 115 feet and the third to a depth of 125 feet. The strata consists principally of gravel to a depth of about 75 feet, then a clay or hard pan to a depth of about 100 feet, under which lies a water bearing gravel stratum from which the supply is obtained. The water rises to within 17 to 40 feet of the surface. There are three privies located within 100 feet of the wells, some 15 buildings 100 to 500 feet distant and 25 buildings 500 to 1,000 feet distant. While it is possible that the clay stratum will prevent pollution from these sources from finding its way into the supply, there is considerable danger of polluted water from near the surface finding its way along the lines of the pipe into the well.

Since containers had not arrived at the time of the inspection, samples of the water could not then be collected. Samples were later collected, however, by the health officer from the spring supply, but since the pump was not in operation none could be collected from the well supply. These samples were sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water at times slightly colored and turbid, but a water ordinarily low in hardness, although in the samples collected February 14, 1912, high figures for hardness were obtained. It is quite probable that the source of this sample was the well supply which would probably account for the high hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low but those for nitrates and chlorine appear to be somewhat above normal. The bacterial counts are frequently high and colon bacilli have been found present in all except one of the 10 c.c. inoculations, occasionally in the 1 c.c. and in samples collected at the time of the inspection in dilutions as small as

1/10 c.c. These results, therefore, indicate the presence of considerable active and potentially dangerous contamination.

As a result of this investigation it may be concluded:

1. That the springs from which the regular water supply of Cohocton is derived, are subject to considerable pollution by surface wash from the stream near which they are located.
2. That there are a number of insanitary conditions in the vicinity of the wells which may cause pollution to this source of supply.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That the springs be more adequately developed and protected from pollution:
   (a) By the construction of more suitable basins or curbs about them.
   (b) By the enclosure of a suitable area with a substantially constructed fence about them and the construction of suitable drainage ditches within this area to divert surface wash from the vicinity.
2. That all privies and cesspools within 300 feet of the wells be provided with watertight containers and that the contents be properly disposed of at regular intervals.

Finally, I would recommend that copies of this report be sent to the various local officials and the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 17, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Cohocton	Steuben	Tap, public supply	1/ 6/12	5	5	....	....	66	....	44	.006	.028	Tr.	1.60	0.70	2.75	35.1	18.0	2,500	+	—	—
Cohocton	Steuben	Tap, public supply	2/14/12	Tr.	Cl.	....	....	176	....	144	.014	.008	Tr.	0.60	0.10	5.25	142.8	139.0	10	—	—	—
Cohocton	Steuben	Tap, public supply	3/22/12	0	10	....	....	7	....	33	.012	.046	Tr.	1.02	3.30	1.75	20.8	16.0	2,500	+	—	—
Cohocton	Steuben	Tap, public supply	10/ 7/12	10	Tr.	....	....	72	....	55	.004	.038	.001	1.00	1.50	3.00	32.5	31.0	9,600	+	+	+
Cohocton	Steuben	Tap, public supply	11/25/12	5	Tr.	....	....	73	....	57	.003	.052	.002	1.40	1.00	3.00	32.5	24.0	500	+	—	—
Cohocton	Steuben	Tap, public supply	1/ 3/13	10	2	....	....	59	....	....	.014	.052	.001	1.50	1.00	2.25	31.2	16.0	9,700	+	—	—
Cohocton	Steuben	Tap, public supply	3/13/13	10	15	....	....	78	....	....	.026	.054	Tr.	0.90	1.40	1.50	26.0	13.0	7,400	+	—	—
Cohocton	Steuben	Tap, public supply	5/ 5/13	15	13	....	....	78	....	....	.022	.074	.001	1.00	1.30	2.25	31.2	13.0	800	+	—	—
Cohocton	Steuben	Tap, public supply	6/10/13	Tr.	2	....	....	73	....	....	.012	.036	Tr.	0.70	0.40	2.50	39.0	32.0	....	+	+	—
Cohocton	Steuben	Spring No. 1	9/27/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	55,000	3+0—	3+0—	1+2—
Cohocton	Steuben	Composite from springs	9/27/17	10	20	....	....	....	....	....	.006	.056	Tr.	0.70	1.40	2.00	37.7	36.0	200	3+0—	2+1—	1+2—

CONSTABLEVILLE

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Constableville, made by Mr. C. M. Baker, assistant engineer, on October 25, 1916.

Constableville is an incorporated village of about 400 inhabitants located on Sugar river in Lewis county, about 5 miles west of the village of Port Leyden and Lyons Falls, which are the nearest railroad stations on the Utica and Ogdensburg branch of the N. Y. C. railroad, about 45 miles north of Utica. It is the center of a prosperous dairying district. No sewer system is provided in the village, the houses being served by privies, cesspools, etc.

The water supply is owned by the municipality and is derived from a spring located about 2½ miles northwest of the village and from an impounding reservoir on a small brook about 1¼ miles northwest of the village. The water flows by gravity from the sources of supply to the village. About 80 per cent of the population are served with the water, there being in all some 90 service taps, none of which are metered. Due to lack of meters or other method of measuring the water used, no definite information could be obtained regarding the consumption, but based on a daily per capita rate of 100 gallons the total consumption would be about 31,000 gallons per day. The static pressure in the village ranges from 110 to 122 pounds per square inch. There are in all about three miles of water mains ranging in size from 4 inches to 8 inches in diameter.

The spring from which a portion of the supply is obtained is located on the side of a hill at the foot of a small swale about 200 feet long by 50 feet wide. Above the swale is meadow land, but cattle were grazing upon it at the time of the inspection. A small dam has been constructed at this place to divert the water into the intake pipe. At the time of the inspection, however, there was a leak in the dam which allowed a large amount of water to escape so that only a small portion of it was entering the pipe. It was apparent that little or no attention had been given to this intake for some time prior to the inspection since the small basin formed by the dam was practically filled up with weeds, dirt and similar material. A small area immediately about the reservoir is fenced. No drainage ditches are provided, however, to divert surface wash from above. The water from this spring flows by gravity to the reservoir, the inlet pipe discharging directly into the outlet pipe from the reservoir, so that spring water enters the reservoir only when the spring supply is greater than the consumption. Another spring located about one-fourth mile north of the spring now in use is owned by the village but has not yet been connected with the supply.

A dam across a ravine forms the impounding reservoir which has a capacity of about 1,000,000 gallons, an equivalent of nearly one month's consumption. Tributary to this reservoir is a watershed having an area of about .4 square mile. The slopes are precipitous. About 25 per cent of the area is wooded, the remainder of the watershed being used almost exclusively for pasture land, cattle having free access to the streams. There are no inhabitants on the watershed, however, and it seems, therefore, that the only pollution of human origin which might reach the supply is accidental, incidental or wilful pollution from trespassers on the watershed.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of these analyses show a water slightly turbid and colored at the time of the inspection, also a water moderate in hardness. The figures for nitrogen in its various forms are low as is also the figure for chlorine. The bacterial counts although not excessive were somewhat high in the water collected from a tap in the village. Colon bacilli were found present in two of the three 10 c.c. inoculations in the sample collected from the spring, but were not found present in the sample collected from the village tap. The contamination indicated by the presence of colon bacilli in

the spring water is probably of animal origin due to the presence of live stock on the area directly above the spring.

It is impossible, however, to accurately judge the character of a water from a single analysis and it is probable that under other conditions, as following a storm, this supply would show greater pollution than at the time of the inspection.

As a result of this investigation it may be concluded:

1. That the spring which furnishes a portion of the water supply for Constableville is inadequately developed and not sufficiently protected from pollution.

2. That the reservoir is subject to pollution by surface drainage from pasture land and also at times from live stock wading in the stream above the reservoir.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That the spring now in use be more adequately developed by enclosing a sufficient area about it with a substantially constructed fence and by the construction of drainage ditches within this enclosure to divert all surface wash.

2. That, in order to eliminate as far as possible the necessity of using water from the storage reservoir which, as pointed out above, is subject to pollution from pasture land, additional springs be developed and the reservoir be used only as an auxiliary supply, in case of fire or excessive draught on the system.

3. That, should it seem impracticable to carry out the above recommendation for the improvement of the sanitary quality of the supply, the village should carefully consider purification of the supply by slow sand filtration or other suitable method.

While it cannot be definitely stated that pollution of water by cattle causes disease, such pollution is objectionable from the aesthetic standpoint and may under certain conditions affect the health of susceptible individuals. In any event it seems advisable that the village authorities seriously consider the protection of the supply from this source of pollution.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 25, 1917

REPORT OF WATER ANALYSES FOR CONSTABLEVILLE

Source		Spring	Tap in well
Collected on		10/25/16	10/25/16
Color		.....	2
Odor, hot		.....	1 v.
Odor, cold		.....	1 v.
Turbidity		.....	5
Solids, total		.....	67
Loss on ignition		.....	13
Mineral residue		.....	54
Ammonia, free		.....	.002
Ammonia, albuminoid		.....	.034
Nitrites		.....	Tr.
Nitrates		.....	0.02
Oxygen consumed		.....	1.30
Chlorine		.....	0.50
Hardness, total		.....	39.0
Alkalinity		.....	33.0
Bacteria per c.c.		75	300
B. coli type	10 c.c.	2+1—	0+3—
	1 c.c.	0+3—	0+3—
	1/10 c.c.	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

CUBA

HERMANN M. BIGGS, M. D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of the village of Cuba, made by Mr. E. S. Chase, assistant engineer, on April 4, 1917.

Cuba is an incorporated village with a population of 1,556, located in the western part of Allegany county, about 13 miles northwest of the city of Olean. Two railroads pass through the village, the Erie and the Pennsylvania. The village is largely residential and is a trading center for the surrounding agricultural country. There is no public sewer system in the village, the houses being served by privies and cesspools.

The water supply is derived by gravity from three sets of springs supplemented at times by pumping from driven wells. The waterworks were designed and constructed by King and Keith in 1890 and 1891. The well supply was added about 1899. The waterworks are owned and operated by the village under the direction of the board of trustees of which Mr. P. J. Keenan is president and Mr. C. A. Trinkle is superintendent.

Practically the entire population of the village is served by the supply and although no definite data could be obtained regarding the water consumption it may be estimated at approximately 150,000 gallons per day. There are about 35 miles of water mains ranging in size from 4 inches to 8 inches in diameter. Of the 450 service taps some 24 only are metered. The average pressure in the village is about 85 pounds per square inch.

One group of three springs is located about 2 miles southwest of the village. Two of these springs, the Shafer and Cole spring No. 1, are developed by masonry catch basins covered by wooden roofs. The third spring, the Cole Ravine spring, consists of a masonry trough about 200 feet long with a wooden cover. This trough collects the ground water flow coming from the side of a rocky ravine. A second spring, the Wright spring, is located about 2 miles southwest of the village on a side hill. This spring issues from the side of the hill and flows through about 100 feet of rubble drain into a small masonry collecting basin. The third group of springs, the Bartel and Thompson springs, is located in a valley about 2 miles south of the village. The Thompson spring is developed by a small masonry catch basin covered by a wooden roof. Two other springs, the Bartel springs, are developed by masonry basins with slab covers flush with the surface of the ground.

The auxiliary well supply is located a short distance from the latter group of springs near the stream draining the valley. At this point three wells have been driven 90, 150 and 230 feet respectively and pass through gravel with an 8-inch iron casing for about 41 feet. Below this point the wells penetrate shale. The water is raised by air lift from the 230-foot well only. It is said, however, that drawing from this well affects the water level in the other two wells. The unused wells are loosely capped. The pumping equipment consists of a 12 by 10 Ingersoll Rand air compressor belted to a 40 horse power oil gas engine. The air lift equipment raises the water to a small elevated tank from which a suction line runs to a 6½-inch by 8-inch Gould triplex pump operated by a 15-horse power Oil City gas engine. This pumping equipment is operated for 6 or 8 months a year. At the time of the inspection this well supply had not been in service for 2 weeks.

The reservoir is located on the side hill just southwest of the village and consists of an open basin 100 by 150 feet in plan, and 12 feet deep, excavated in the side hill and lined with stone and concrete.

There seems to be little opportunity for serious contamination of the spring supplies. The spring southeast of the village, however, is open to surface wash although the area in its vicinity is owned by the village and surrounded by a fence. Two of the springs south of the village are also open to surface wash, due to the fact that they are less satisfactorily

developed than the others. The covers of certain of the springs were not locked. With the exception of a privy at the pumping station there appears to be no sources of contamination in the vicinity of the driven wells.

At the time of the inspection samples of the water were collected and the results of these analyses together with others made in the past by the Division of Laboratories and Research will be found in the appended table.

In view of the fact that these analyses represent samples from the various sources, it is difficult to secure from them information of any particular value on account of the varying proportions of the water from the various sources present at different times. Usually the bacterial counts have been high and organisms of the B. coli type comparatively prevalent although the analyses of samples collected since 1912 indicate a marked improvement in the sanitary quality of the supply. It is probable that improvements in the methods of protecting the springs from surface wash have been made from time to time. From the inspection of the sources of the supply, it seems probable that the contamination indicated has been due to surface wash or infiltration of surface drainage into the springs.

In view of the above facts the following conclusions may be drawn:

1. That the springs from which the public water supply of Cuba is derived should furnish water of a satisfactory sanitary quality provided steps are taken to more fully protect the springs from surface wash.
2. That the wells used at times of inadequate flow from the springs are also favorably situated to furnish a supply of satisfactory sanitary quality, although the privy at the pumping station is located too near the wells.
3. That, according to statements by the local authorities, the present sources of supply are reaching their limit of yield and that an additional supply may have to be secured from some other source in the near future.

In view of the above facts the following recommendations may be made:

1. That the various springs be protected from surface wash by adequate drainage ditches and the area immediately surrounding them be fenced to exclude animals. Furthermore, the structures covering the tops of the various basins should be kept securely locked in order to prevent access thereto by trespassers in the vicinity.
2. That the Wright spring, southeast of the village, be developed, in a manner similar to the first group of springs, by a masonry basin in order that surface drainage may not have access thereto.
3. That the Bartel springs, south of the village, be protected from surface wash by raising the side walls adequately above the surface of the ground and by covering with proper roofs.
4. That the privy near the driven wells be removed from the immediate vicinity and placed at least 500 feet down stream.
5. That the unused wells be tightly capped to prevent contamination of the ground water through them.
6. That the village authorities investigate the possibility of economic development of additional springs in order to augment the present supply, and if necessary, secure the services of a competent engineer to advise them as to the best and most economical method to adopt.

In conclusion I would further recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 5, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Cuba	Allegany	Tap, public supply	1/23/12	Tr.	Cl.						.020	.022	.001	0.64	0.50	5.5	103.0	99.0	750	+	+	—
Cuba	Allegany	Tap, public supply	2/23/12	Tr.	Cl.						.020	.031	Tr.	0.68	0.70	6.3	91.0	90.0	230	+	—	—
Cuba	Allegany	Tap, public supply	4/13/12	Tr.	Cl.						.004	.014	Tr.	0.44	0.60	4.5	80.0	78.0	120	+	+	—
Cuba	Allegany	Tap, public supply	9/26/12	Tr.	Cl.						.002	.002	.001	0.26	0.20	60.5	78.0	.....	750	+	+	—
Cuba	Allegany	Tap, public supply	11/14/12	Tr.	Cl.						.010	.040	.001	0.26	0.80	41.0	69.0	.....	6,200	+	—	—
Cuba	Allegany	Tap, public supply	12/18/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13,500	—	—	—
Cuba	Allegany	Tap, public supply	2/24/13	Tr.	Cl.						.078	.098	Tr.	0.50	0.80	8.0	91.0	104.0	750	+	—	—
Cuba	Allegany	Tap, public supply	4/ 7/13	Tr.	Cl.						.010	.022	Tr.	0.20	0.60	5.0	86.0	81.0	10	—	—	—
Cuba	Allegany	Tap, public supply	5/26/13	3	Tr.						.016	.026	.001	0.34	0.70	6.5	97.0	101.0	2	+	—	—
Cuba	Allegany	Tap, public supply	7/23/13	Tr.	Cl.						.004	.006	.001	0.24	0.30	4.9	70.0	.....	.....	—	—	—
Cuba	Allegany	Tap, public supply	4/18/14	Tr.	2						.010	.020	.001	0.60	0.80	1.4	80.0	79.0	25,000	—	—	—
Cuba	Allegany	Tap, public supply	12/21/15	Tr.	Tr.						.020	.014	.003	0.70	1.20	3.3	111.0	92.0	300	—	—	—
Cuba	Allegany	Tap, public supply	4/ 4/17	0	Tr.	0	1 v.				.003	Tr.	Tr.	Tr.	0.40	2.3	76.0	71.0	*1,600	2+0—	0+3—	0+3—

* Three days in transit.

DELANSON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the public water supply of the village of Delanson, Schenectady county. An investigation of this supply was made on November 20, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. R. A. McDowell, health officer, and Mr. E. Harris, superintendent.

Delanson is an unincorporated village located in the town of Duanesburg and in the southwestern part of Schenectady county, about 15 miles southwest of the city of Schenectady. It is on the Normanskill and on the Delaware and Hudson railroad. It is largely a railroad community being located at the junction of the lines coming from Schenectady and Albany to Binghamton and the west. The population at the time of the inspection was estimated to be about 400.

There are no private or public sewers in the village. Excretal and other wastes are disposed of in cesspools and privies.

The water supply is owned by the Duanesburg Water Company of which Mr. R. Warren of Cooperstown is vice-president and Mr. E. Harris is superintendent. The waterworks were designed by Mr. F. Roundy and Mr. C. E. Miller, civil engineers, and were constructed by day labor in 1892.

The water supply is obtained from 2 brooks tributary to the Normanskill, the intakes being about 1½ and 4 miles north of the village. About 4 miles north of the village a shallow impounding reservoir has been formed upon one of the brooks by the construction of a dike or dam across the brook. Water from this reservoir passes down through a pipe line and discharges into the brook about 1 mile below the reservoir. The water is again taken from the brook at a point about 2 miles below the reservoir and conveyed through a pipe line to another reservoir located upon the second brook about 1½ miles north of the village. This latter reservoir is formed by the construction of a dam across the southern brook and from this reservoir the water is conveyed through a pipe line to the village.

There are about 5½ miles of water mains about 4 inches in diameter. The average pressure in the village is 60 pounds per square inch. There are about 92 houses in the village of which 39 are served by this water supply. About 42 per cent of the population, 168 people, are served by the supply and the average daily consumption was estimated to be about 17,000 gallons. No fire protection is provided by this supply.

The upper reservoir is very shallow and contains many tree stumps and the bed of the reservoir is probably an old swamp. This reservoir is said to contain about 50,000,000 gallons of water. A road passing along the south side of this reservoir forms a dike and a small spillway under the road permits the surplus water from the reservoir to overflow and pass down the brook. The reservoir on the southern brook is in much better condition, is quite deep and there is only a small amount of swamp at the upper end. This reservoir is said to contain about 30,000,000 gallons of water. The northern brook above the intake has a watershed including the reservoir, of about 2⅓ square miles while the southern brook at the lower reservoir has a watershed of about .2 square mile.

There are about 11 houses on the northern watershed and one on the southern watershed. This gives a total population of about 40 which corresponds to 16 per square mile. The houses are all well back from the watercourses and it is doubtful if direct pollution is received from the houses on the watersheds. The water is turbid at times of rapid runoff due to heavy rains. During the dry seasons of 1913, 1914 and 1916, the use of water had to be curtailed somewhat on account of the small amount available.

At the time of the inspection samples of the village water were obtained and the results of the analyses of these samples together with others made by the Division of Laboratories and Research in previous years will be found in the appended table.

From the results of these analyses it will be seen that the water is somewhat colored, occasionally turbid and moderately soft. The free ammonia is high at times and this together with the high albuminoid ammonia and oxygen consumed is undoubtedly due to the vegetable matter from the swamps upon the watersheds. With the exception of the analysis of August 31, 1915, the total bacterial counts have been moderate. The analysis of this date, however, shows an excessive number of bacteria and organisms of the B. coli type present in 1 c.c. inoculations indicating that the water was receiving considerable active contamination. The sample taken November 20, 1916, shows the presence of B. coli organisms in 10 c.c. inoculations. The high turbidity of the sample taken at the upper part of the village on this date was undoubtedly due to the fact that repairs had been made in the pipe line on the day previous to the investigation.

As a result of this investigation and of the analyses the following conclusions may be drawn:

1. That the water supply of Delanson is apparently of a fairly satisfactory, sanitary quality for a surface supply although subject to accidental, incidental or wilful contamination by animals or persons passing over the watersheds.
2. That the water is highly colored due to the vegetation and organic matter and is occasionally turbid due to surface wash at times of rainfall.

In view of the above conclusions I would make the following recommendations:

1. That the water company take every precaution to maintain the watersheds tributary to its supply in a satisfactory sanitary condition and in case any difficulty be experienced in carrying out this recommendation application should be made to this Department for the enactment of rules and regulations for the protection of the supply from contamination as provided for by the Public Health Law.
2. That signs be posted around the reservoir and along the streams tributary to the supply warning against pollution of the waters therein.
3. That, in view of the possibility of accidental, incidental or wilful contamination by the residents upon the watershed or by transient visitors thereto, the water company consider the installation of a modern purification plant for further safe-guarding the sanitary quality of the supply.

In conclusion I would recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 20, 1917

REPORT OF WATER ANALYSES FOR DELANSON

Source	Tap at R. R. station	Reservoir	Reservoir	Tap at R. R. station	Tap upper part of village
Collected on	1/1/13	8/31/15	1/3/16	11/20/16	11/20/16
Color	.....	20	10	8	8
Odor, hot	.....	1 a.	1 a.	1 v.	2 v.
Odor, cold	.....	1 a.	1 a.	1 v.	2 v.
Turbidity	.....	10	Tr.	2	30
Solids, total	.....	59	76	.....	.....
Loss on ignition	.....	17	15	.....	.....
Mineral residue	.....	42	61	.....	.....
Ammonia, free	.....	.034	.034	.004	.004
Ammonia, albuminoid	.....	.228	.146	.114	.258
Nitrites	.....	.003	.001	.001	.005
Nitrates	.....	.08	.10	.06	.05
Oxygen consumed	.....	7.7	8.1	8.4	10.0
Chlorine	.....	1.0	1.0	0.75	0.75
Hardness, total	.....	32.5	57.1	40.3	40.3
Alkalinity	.....	21.0	36.0	23.0	25.0
Bacteria per c.c.	35	8,800	60	60	50
B. coli type 10 c.c.	—	+	—	1+2—	3+0—
B. coli type 1 c.c.	—	+	—	0+3—	0+3—
B. coli type 1/10 c.c.	—	—	—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

DOVER PLAINS

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Dover Plains made by Mr. C. M. Baker, assistant engineer, on January 18, 1917.

Dover Plains is an unincorporated village of about 600 inhabitants located in the town of Dover, Dutchess county, on the Harlem division of the New York Central railroad, about 76 miles south of Albany. It is on the Ten Mile river, a tributary to the Housatonic river in Connecticut.

The water supply is controlled by the Dover Plains Water Company and was first put into operation in 1900. The supply is derived from a small brook, about 1 mile southwest of the village, which is tributary to Ten Mile river. Eighty to 85 per cent of the population is served with the water, there being in all 66 service taps, none of which are metered. Since no meters or other method of measuring the water is provided no definite information could be obtained regarding the consumption, but based on a per capita rate of 100 gallons daily the total consumption would be approximately 50,000 gallons per day. There are in all about 6,000 feet of mains ranging in size from 4 to 10 inches in diameter except for one or two short lines of 1-inch pipe which supply only 2 or 3 houses. The water is conducted by gravity from impounding reservoirs on the brook to the village, the pressure in the village being approximately 88 pounds per square inch.

There are two reservoirs, the larger and upper one having a capacity roughly estimated at 525,000 gallons. The lower or intake reservoir has a capacity of about 27,000 gallons. These reservoirs are said to be cleaned every spring and fall.

The watershed is approximately 2.16 square miles in area and has a total population of 10 persons or about 5 per square mile. The upper part of this area is gently sloping land but the lower portion is precipitous. Fifteen or 20 per cent of the area is wooded, the remainder being used principally for pasture and meadow land. The water company owns about 40

acres in the immediate vicinity of the reservoirs, and the superintendent of the company owns some 60 acres along the stream. The soil consists principally of rock and clay.

There are three houses on the watershed, one of which, however, is unoccupied. One of the occupied houses is located well back from the stream, the other, however, is near the north fork of the creek. At this latter place the buildings are close to the stream. A tenement-house is only about 30 feet distant while the privy serving it, which is not provided with a vault, is only 35 feet distant. The barn is close to the stream and the barnyard extends to it. There was a large pile of manure in the barnyard at the time of the inspection although the inspector was informed that the cattle which had been maintained on the farm during the summer had been sold and that only a horse and cow were kept in the barn at the time of the inspection. The privy mentioned above could be moved about 75 feet east to a point where the drainage would be away from the stream proper. The present insanitary conditions on this farm constitute a serious menace to the sanitary quality of the supply.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the result of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water usually satisfactory with respect to color and turbidity, also a water that is moderate in hardness. The figures for nitrogen in its various forms are low but those for chlorine appear to be above normal. The bacterial counts are at times high and colon bacilli are found present in nearly all of the 10 c.c. inoculations, frequently in the 1. c.c. and in one instance in a 1/10 c.c. inoculation, thus indicating the presence of considerable active and potentially dangerous contamination.

As a result of this investigation it may be concluded:

1. That the water supply of Dover Plains is derived from a source which is subject to pollution from one farm located very close to the stream and also to accidental, incidental and wilful pollution by trespassers upon the watershed.

In view of the above, I beg to offer the following recommendations to be acted upon by the water company:

1. That the privy on the farm mentioned in the body of the report be moved to a greater distance from the stream, that the barnyard be rearranged so that it does not extend to the stream, and that sanitary conditions be maintained at all times on these premises.
2. That consideration be given to the providing of adequate purification for the supply either in the form of filtration or sterilization with liquid chlorine or possibly a combination of both.
3. That every endeavor be made to maintain satisfactory sanitary conditions at all times upon the watershed and that should any difficulty be experienced in this connection the water company make application to this Department for the enactment of rules and regulations protecting the sanitary quality of the supply.

In conclusion I would recommend that copies of this report be sent to the local officials and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 8, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Dover Plains	Dutchess	Tap, public supply	1/19/10	2	Cl.	....	....	40	....	28	.008	.024	.001	0.20	0.50	0.50	24.7	21.0	120	+	+	−
Dover Plains	Dutchess	Tap, public supply	10/25/10	5	2	....	....	60	....	46	.026	.040	.002	Tr.	0.70	1.50	40.3	39.0	80	+	+	−
Dover Plains	Dutchess	Tap, public supply	2/22/11	Tr.	Tr.	....	....	52	....	39	.008	.016	.003	0.16	1.00	2.00	29.9	29.0	180	+	+	−
Dover Plains	Dutchess	Tap, public supply	5/ 9/11	Tr.	Cl.	....	....	44	....	35	.036	.070	.002	Tr.	0.80	1.75	32.5	26.0	140	+	+	−
Dover Plains	Dutchess	Tap, public supply	6/22/11	20	25	....	....	63	....	42	.022	.026	.002	Tr.	1.70	1.63	37.7	24.0	200	+	+	−
Dover Plains	Dutchess	Tap, public supply	9/20/11	Tr.	Cl.	....	....	67	....	62	.020	.032	.001	0.04	0.50	1.50	60.0	40.0	1,700	−	−	−
Dover Plains	Dutchess	Tap, public supply	11/ 9/11	5	Cl.	....	....	44	....	32	.004	.030	.001	0.04	1.40	1.25	31.2	21.0	275	+	−	−
Dover Plains	Dutchess	Tap, public supply	12/15/11	5	Cl	....	....	42	....	42	.014	.034	.001	0.10	0.80	6.75	22.1	22.0	375	+	−	−
Dover Plains	Dutchess	Tap, public supply	1/19/12	5	Cl.	....	....	48	....	37	.024	.020	.001	0.20	0.20	1.50	26.0	23.0	70	+	−	−
Dover Plains	Dutchess	Tap, public supply	2/28/12	Tr.	Cl.	....	....	44	....	34	.006	.030	.001	0.24	1.00	1.50	19.5	15.0	9,400	−	−	−
Dover Plains	Dutchess	Tap, public supply	3/29/12	10	Tr.	....	....	38	....	24	.005	.046	.001	0.14	1.60	1.75	16.9	12.0	2,000	+	+	−
Dover Plains	Dutchess	Tap, public supply	5/ 3/12	Tr.	Tr.	....	....	46	....	34	.002	.048	Tr.	0.02	1.20	0.75	20.8	20.0	60	−	−	−
Dover Plains	Dutchess	Tap, public supply	8/30/12	Tr.	Cl.	....	....	83	....	60	.002	.018	Tr.	0.12	0.70	1.12	41.6	40.0	600	+	−	+
Dover Plains	Dutchess	Tap, public supply	10/18/12	Tr.	Cl.	....	....	58	....	46	.002	.054	Tr.	0.02	1.00	1.62	40.3	40.0	110	+	−	−
Dover Plains	Dutchess	Tap, public supply	12/21/12	10	Tr.	....	....	50	....	44	.014	.056	.001	0.12	1.80	1.50	27.3	33.0	1,600	+	−	−
Dover Plains	Dutchess	Tap, public supply	1/24/13	Tr.	Cl.	....	....	42	....	....	.014	.040	.001	0.20	1.00	1.75	24.7	18.0	170	+	−	−
Dover Plains	Dutchess	Tap, public supply	2/27/13	Tr.	Cl.	....	....	49	....	....	.016	.022	.001	0.18	0.30	1.75	23.4	22.0	210	−	−	−
Dover Plains	Dutchess	Tap, public supply	4/11/13	Tr.	Cl.	....	....	40	....	....	.012	.056	.001	0.10	0.50	1.37	24.7	20.0	110	−	−	−
Dover Plains	Dutchess	Tap, public supply	5/23/13	Tr.	Cl.	....	....	56	....	....	.012	.030	Tr.	0.06	0.60	0.75	28.6	26.0	275	+	−	−
Dover Plains	Dutchess	Tap, public supply	7/ 1/13	15	2	....	....	59	....	....	.004	.068	.001	0.14	0.80	1.75	32.5	32.0	.....	+	−	−
Dover Plains	Dutchess	Tap in village marked "A"	1/18/17	Tr.	Cl.	1 v.	1 v.	....	....	....	.014	.025	.001	0.10	1.40	4.00	23.4	21.0	300	3+0−	0+3−	0+3−

EAST WORCESTER

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on a re-inspection of the public water supply of the village of East Worcester, this investigation being made by Mr. E. S. Chase, assistant engineer, in this Department, on July 3, 1917.

The water supply of this village is derived from Oak creek, the intake being located about one mile north of the center of the village. The supply is subjected to treatment by filtration through a pressure mechanical filter.

Previous inspections of this supply were made in 1910 and 1915, and the report upon the inspection of 1915 will be found on page 370, Vol. 2, of the 36th Annual Report of this Department. The waterworks system in general remains practically the same as described in detail in this earlier report.

Complaint has been made this summer by residents of the village with respect to the occurrence of fishy tastes in the water. It appears that the dam at one of the storage reservoirs located near the head waters of Oak creek, went out during a heavy rainfall a few weeks prior to the inspection. This failure of the dam brought about flood conditions in the stream tributary to the supply and rendered the water delivered to the village very turbid. Dead fish were noticed along the banks of the stream after the flood waters had receded and it was to these fish that the fishy taste and odors were attributed. It appears possible, however, that this taste was due to algae growths in the reservoir being carried down stream with the flood and through the filter into the supply.

In connection with the operation of the filter it should be noted that there was no alum on hand in the filter house at the time of the inspection although it was stated by the superintendent that an order for alum had been placed. Furthermore, the superintendent could not state the date upon which the alum pot had been filled with alum nor as to how much alum was used. The health officer stated that upon such times as he had visited the filter he had never found any reserve supply of alum on hand. It is evident, therefore, that even though alum may be used its application is extremely unreliable with the result that the filter acts mainly as a strainer for removing the grosser particles of turbidity.

At the time of the inspection in 1915, the following conclusions were drawn:

1. That the East Worcester Water Company has taken steps to carry out the recommendations of this Department in regard to improving conditions upon the watershed.
2. That this filtration plant is apparently capable of producing a satisfactory quality of effluent provided the sanitary quality of the raw water is protected as far as possible by the elimination of direct sources of pollution on the watershed.
3. That the present uncertain and unsatisfactory method of applying alum tends to preclude the accomplishment by the filter of as high a degree of purification as circumstances demand.
4. That the conditions on the watershed tributary to this supply are such as to bring about a certain amount of contamination of the supply from surface wash at times of rainfall, from pastures, manured land, barn-yards, and in some cases from privies. In addition there is the ever present possibility of contamination of an accidental, incidental or wilful nature which exists upon all well populated watersheds.

As a result of these conclusions the following recommendations were made:

1. That the East Worcester Water Company have frequent and regular inspections made of the watershed in order to detect and remove any sources of permanent contamination which may exist, and in case of difficulty apply to this Department for the enactment of rules and regulations for the sanitary protection of the water supply.
2. That the water company apply alum to the raw water more constantly and in greater quantities in order that efficient coagulation may be produced for the proper operation of the filter.

3. That the water company install some method of measuring the rate of filtration of the filter in order to determine the necessary amount of alum to be added, or else provide for daily tests of alkalinity and turbidity to serve as guides in the operation of the filter.

On this recent investigation it appears that the water company has carried out none of the recommendations of this Department. Furthermore, the superintendent stated that he had not himself been informed by the company as to the nature of these recommendations.

Subsequent to the time of inspection samples of raw and treated water were collected by the health officer, Dr. Nichols, and the result of the analyses of these samples may be found in the appended table.

The results of these analyses show the presence of active contamination in both raw and filtered water, as evidenced by the occurrence of organisms of the B. coli type in 1 c.c. inoculations. Furthermore, these results indicate that the purification process was bringing about no improvement at the time of the collection of these samples.

In view of the above facts the following conclusions may be drawn:

1. That the East Worcester Water Co. has failed to carry out any of the recommendations of the report of 1915.
2. That the need for these recommendations still exists.

I would recommend, therefore, that the water company give their immediate attention to the previous recommendations of this Department as given in detail in the body of this report and take steps to carry them out at the earliest possible moment.

I further recommend that copies of this report be transmitted to the East Worcester Water Company, the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 27, 1917

REPORT OF WATER ANALYSES FOR EAST WORCESTER

Source	Great Bear supply unfiltered	Filtered water
Collected on	8/3/17	8/3/17
Color	20	15
Odor, hot	2 v.	2 v.
Odor, cold	1 v.	1 v.
Turbidity	2	Tr.
Solids, total	.....	.....
Loss on ignition	.....	.....
Mineral residue	.....	.....
Ammonia, free	.008	.006
Ammonia, albuminoid	.140	.090
Nitrites	Tr.	Tr.
Nitrates	.05	.05
Oxygen consumed	4.0	3.2
Chlorine	1.25	.5
Hardness, total	36.4	50.0
Alkalinity	33.0	48.0
Bacteria per c.c.	800	700
B. coli type, 10 c.c.	3+0—	3+0—
B. coli type, 1 c.c.	1+2—	2+1—
B. coli type, 1/10 c.c.	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

EDMESTON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Edmeston made by Mr. C. M. Baker, assistant engineer, on April 13, 1917.

Edmeston is an unincorporated village of about 700 inhabitants located in the town of Edmeston, Otsego county, at the northern terminus of the New Berlin branch of the N. Y. O. & W. railroad, 32 miles north of Sidney. No sewer system is provided in the village, the houses being served by privies, cesspools, etc.

The water supply is owned and operated by the Edmeston Water Works Company of which Mr. A. C. Moorehouse is president and Mr. Homer Underwood, superintendent. The system was first put into operation in 1896. In 1908 a new supply was developed, the old supply being retained as an auxiliary supply for fire protection. The regular or domestic supply is derived from springs located about 1¾ miles west of the village from which the water flows by gravity through the distribution system into a storage reservoir located on the hillside west of the village. The fire supply is derived from springs located about three-fourths of a mile west of the village from which the water flows by gravity to a storage reservoir just above the domestic reservoir and from which the water may be discharged into the distribution system. About 95 per cent of the population is served with the water, there being in all about 150 service taps, none of which are metered. Due to the lack of meters or other method of measuring the water used no definite information could be obtained regarding the consumption, but based upon a per capita rate of 100 gallons per day the total consumption would be about 70,000 gallons daily. The flow of the springs of the domestic supply is said to have been estimated to be about 175,000 gallons daily. It thus appears that there is an abundant supply of water for the present needs of the village. There are in all some 6 miles of water mains ranging in size from 4 to 10 inches in diameter. The pressure from the domestic reservoir is about 60 pounds per square inch while that from the fire reservoir is approximately 105 pounds per square inch.

Each of the reservoirs is constructed of concrete and covered. The one for the domestic supply is 20 by 25 feet in plan and 10 feet deep and has a capacity of about 30,000 gallons. The fire reservoir is 95 by 55 feet in plan by 23 feet deep and has a capacity of 900,000 gallons.

The springs from which the domestic supply is obtained are located on the side of a hill near a small stream. They consist of drain or collecting tile laid 5 or 6 feet below the surface which collect the ground water and discharge into a collecting basin whence the water flows by gravity to the distribution system. There are two groups of springs at this place, the main one of which is enclosed by a fence, the other, however, is not so protected. Considerable trouble has been experienced because of roots growing through joints of the tile and it is planned, therefore, so the engineer was informed, to cover the area over the springs with concrete and in connection with this improvement to construct a wall at the upper side to divert surface wash. The springs are located in pasture land there being no inhabitants in the vicinity. It seems, therefore, that the only possibility of pollution is that of infiltration of surface wash from the pasture land. Due to the depth of the drain tile, however, it seems that there is little danger of contamination from this source.

The spring from which the fire supply is derived is located in pasture land about one-fourth of a mile north of the fire reservoir and is developed in the same manner as those of the domestic supply except that the tile are not laid so deep as a result of which this supply is subject to more direct pollution from surface wash from the pasture land. There are no inhabitants, however, and it appears that there is little danger of pollution except that mentioned above. No fence is provided about the spring.

Samples of the water were collected at the time of the inspection, and sent to the Division of Laboratories and Research for analyses, the results of

which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but a water that is somewhat high in hardness. The figures for nitrogen in its various forms are low although the figures for chlorine appear to be somewhat above normal. The bacterial counts are usually low although colon bacilli are occasionally present in 10 c.c. inoculations, thus indicating the presence of a certain amount of active contamination. It is probable, however, that this pollution is due to infiltration of surface wash from the pasture land and that it is of animal rather than of human origin.

As a result of this investigation it may be concluded:

1. That the domestic water supply of Edmeston is derived from a source which appears to be free from pollution except possibly that due to indirect infiltration of surface wash from pasture land.
2. That the fire supply is derived from a source which is subject to pollution by the infiltration of surface water somewhat more directly than is that of the domestic supply and since this supply may be turned into the distribution system at times of fire or other emergency it should be adequately protected from pollution.

In view of the above, I beg to offer the following recommendations to be acted upon by the water company:

1. That the contemplated improvements in connection with the domestic supply be carried out with as little delay as possible and furthermore that a fence be provided about the second group of springs.
2. That in reference to the springs from which the fire supply is derived, it seems advisable that a fence be constructed about the area and that cattle be not allowed within the enclosure.

Finally I would recommend that copies of this report be sent to the water company, the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May 29*, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c. c.
Edmeston	Otsego	Tap, public supply	1/30/12	Tr.	Cl.	....	....	122	....	100	.024	.014	Tr.	0.72	0.20	1.00	91.4	91.0	30	−	−	−
Edmeston	Otsego	Tap, public supply	3/ 8/12	Tr.	Cl.	....	....	125	....	106	.006	.028	.001	0.80	0.50	1.25	91.4	90.0	6	−	−	−
Edmeston	Otsego	Tap, public supply	4/10/12	Tr.	Cl.	....	....	146	....	125	.004	.016	Tr.	0.50	0.40	1.75	111.4	95.0	90	+	−	+
Edmeston	Otsego	Tap, public supply	10/12/12	5	Cl.	....	....	126	....	112	.004	.016	Tr.	0.70	1.20	1.00	105.8	91.0	.....	+	−	−
Edmeston	Otsego	Tap, public supply	11/15/12	Tr.	Cl.	....	....	123	....	111	.008	.012	.001	0.80	2.20	1.50	97.2	93.0	30	−	−	−
Edmeston	Otsego	Tap, public supply	12/ 7/12	Tr.	Cl.	....	....	121	....	99	.004	.022	Tr.	0.80	0.80	1.00	94.2	92.0	1,800	−	−	−
Edmeston	Otsego	Tap, public supply	2/ 7/13	Tr.	Cl.	....	....	110	....	....	.004	.014	Tr.	0.70	0.40	1.25	91.4	91.0	20	−	−	−
Edmeston	Otsego	Tap, public supply	3/19/13	Tr.	Cl.	....	....	116	....	....	.016	.008	Tr.	0.70	0.50	1.00	88.6	90.0	20	−	−	−
Edmeston	Otsego	Tap, public supply	4/23/13	Tr.	Cl.	....	....	116	....	....	.008	.006	Tr.	0.60	0.10	1.00	91.4	90.0	50	−	−	−
Edmeston	Otsego	Tap, public supply	6/ 4/13	Tr.	Tr.	....	....	114	....	....	.004	.012	.001	0.50	0.60	2.00	83.2	90.0	30	−	−	−
Edmeston	Otsego	Tap, public supply	7/16/13	Tr.	Cl.	....	....	171	....	....	.004	.006	Tr.	0.50	0.60	1.00	85.7	87.0	15	+	−	−
Edmeston	Otsego	Tap, public supply	2/31/14	Tr.	Cl.	....	....	121	....	108	.020	.046	Tr.	1.20	0.50	1.37	100.0	98.0	35	−	−	−
Edmeston	Otsego	Collecting basin, domestic supply	4/13/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	0+3−	0+3−	0+3−
Edmeston	Otsego	Tap in village, domestic supply	4/13/17	Tr.	Cl.	1 v.	1 v.	....	....	....	.014	Tr.	Tr.	Tr.	0.60	2.10	108.6	98.0	10	0+3−	0+3−	0+3−
Edmeston	Otsego	Spring, fire supply	4/13/17	Tr.	Cl.	1 v.	1 v.	....	....	....	.014	.012	Tr.	Tr.	0.70	1.25	23.4	19.0	100	2+1−	0+3−	0+3−

ELMSFORD

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of the village of Elmsford, Westchester county. The investigation of this supply was made on December 26, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. L. P. Dosh, health officer of the village of Elmsford.

Elmsford is an incorporated village in Westchester county about 20 miles north of New York city and about 3 miles east of the Hudson river. It is on the Sawmill river and the Harlem Division of the New York Central and Hudson River R. R. It also has trolley car service from White Plains and Tarrytown. The population at the time of the inspection was estimated to be about 1,380.

There are no public or private sewers in the village. Excretal and other wastes are disposed of in septic tanks, cesspools and privies.

The waterworks are owned by Gordon-Gallagher Co. of New York city, of which Mr. M. J. Gordon of 100 5th avenue is president and Mr. J. Sokol of Elmsford is collector and local representative of the company. The waterworks were constructed in 1890 by former owners of the waterworks.

The water is obtained from a drilled well located in the lower and southern part of the village. Water from this well is pumped from the pumping station located over the well direct to the village mains and to the reservoir located on a hill a short distance east of the well. About 380 residents or 28 per cent of the total population are served by this water supply. The average daily consumption was estimated to be about 8,000 gallons. There are about 1½ miles of water mains varying from 1 to 2 inches in diameter. The average pressure in the village is about 30 pounds per square inch; this, however, varies considerably, depending upon the amount of water being used at any one time. There are four hydrants on the system which are rarely if ever used on account of the small amount of water than can be supplied through the service mains.

The reservoir is of concrete, 21 feet in diameter and is covered with a frame roof. It has a capacity of about 11,300 gallons and at the time of the inspection there were about 6 feet of water in the reservoir.

The well is about 170 feet deep, the larger part of the depth being drilled through rock. Water usually stands within about 6 feet of the surface. The pumping station located at the well is about 8 feet by 12 feet in plan and is a frame building. The pumping equipment is in duplicate and consists of two direct acting 5 by 5-inch plunger pumps. Each pump is operated by a three horse-power Century electric motor. The pump attendant visits the plant to start the pump in the morning and when the reservoir is about filled he again visits the station and shuts the plant down for the day.

There are 17 houses within 500 feet of the well and about 10 more houses within from 500 to 1,000 feet of the well. The district school having a capacity for about 400 pupils is located on the hillside, a short distance above the well. It is proposed to use a subsurface irrigation system for the disposal of the sewage from the school although at present large privies are being used. Many of the houses on the hillside above the well have privies and cesspools and the drainage from these and from the privies at the school undoubtedly pass through the ground and eventually reaches the ground water tributary to the public water supply.

At the time of the inspection a sample of the water was collected from a tap in the village and the analysis of this sample will be found in the appended table.

From the results of this analysis it will be seen that the water at the time of the inspection was clear and free from color and odor. The figures for nitrogen in its various forms were low with the exception of that for nitrates and the high figures for the nitrates together with the high figures for chlorine indicate considerable pollution of the ground water which had been rendered inactive by the natural processes of purification. The bacterial count was low

and organisms of the B. coli group were not found in the 10 c.c. inoculations tested.

As a result of this investigation and of the analysis the following conclusions may be drawn:

That the well from which the water supply of Elmsford is derived is unfortunately located with respect to the numerous opportunities for pollution of the tributary ground water by drainage from cesspools and privies located on the hillside adjacent to and above the well. That pollution of the ground water occurs is shown by the analysis and although this pollution was not active at the time of the inspection, it is possible that under different hydraulic conditions of the ground water active and potentially dangerous contamination of the well may occur at any time.

In view of the above conclusions, I would make the following recommendations:

1. That the water company consider at once the securing of a new source of water supply free from all possibility of pollution, or
2. That all the houses and buildings within 500 feet of the well be provided with satisfactory sewerage facilities to properly dispose of the sewage from such buildings, or,
3. That all privies within this area be provided with removable tight containers and that no leaching cesspools or subsurface irrigation plants for the disposal of sewage be permitted within this area.

I would also recommend that copies of this report be sent to the water company, to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 29, 1917

REPORT OF WATER ANALYSIS FOR ELMSFORD

Source		Tap in village
Collected on		12/26/16
Color		Tr.
Odor, hot		1 v.
Odor, cold		1 v.
Turbidity		Cl.
Solids, total		340
Loss on ignition		75
Mineral residue		265
Ammonia, free		.004
Ammonia, albuminoid		.004
Nitrites		.001
Nitrates		3.00
Oxygen consumed		0.60
Chlorine		10.25
Hardness, total		250.0
Alkalinity		248.0
Bacteria per c.c.		10
B. coli type	10 c.c.	0+3—
	1 c.c.	0+3—
	1/10 c.c.	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

FORESTPORT

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Forestport, made by Mr. C. M. Baker, assistant engineer, on October 24, 1916.

Forestport is an incorporated village of 505 inhabitants, located in Oneida county, on the Adirondack Division of the N. Y. C. & H. R. R. R., 30 miles north of Utica. The village proper, however, is about 1½ miles northwest of the railroad station, near a dam forming a reservoir on Black river, which provides storage for a Black river canal feeder. There are three private sewer systems in the village, each serving 10 or 12 families. They discharge without treatment into the Black river.

The water supply is owned by the village and was put into operation in 1903 or 1904. Since the original installation some 3,000 feet of tile pipe across a swampy area has been replaced with wooden pipe, due to clogging of the tile with roots, etc. The only other improvements have consisted of extensions to the distribution system.

The supply is derived from an impounding reservoir formed by a small dam across Crystal creek, about three miles northeast of the village. From the impounding reservoir the water flows by gravity to the village and through the distribution system into an equalizing reservoir. About 75 per cent of the population is served with the water, there being in all 140 service taps, none of which are metered. The mains consist of 3¼ miles of 4 and 8-inch pipe. The pressure in the village averages approximately 52 pounds per square inch.

The dam which forms the impounding reservoir is constructed of concrete. This reservoir is of irregular area and no definite figures were available regarding its capacity. It probably provided, however, for about 750,000 gallons storage. The equalizing reservoir into which the water flows from the impounding reservoir is located about one-half mile southeast of the village on a hill. It is constructed of concrete and is 80 by 100 feet in plan by 12 feet deep, thus having a capacity of 720,000 gallons. This reservoir is adequately protected from surface wash, and although uncovered it is protected from trespassers by a woven wire fence placed 8 or 10 feet from its edge.

The watershed tributary to the supply which is uninhabited and mostly wooded is slightly over 1 square mile in area. Most of it is owned by the State, but can now be purchased, since it is not a part of the forest reserve. The watershed consists of gently sloping land, and the stream is fed to a considerable extent by springs. No insanitary conditions were observed at the time of the inspection, and it is apparent that the supply is subject to only accidental, incidental or wilful pollution by trespassers on the watershed.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water that is at times somewhat colored, but one that is low in turbidity and only moderately hard. The figures for nitrogen in its various forms are low, as are also the figures for chlorine. The bacterial counts are comparatively low for a surface supply and colon bacilli are found present only occasionally in 10 c.c. inoculations, thus indicating the presence of only a small amount of contamination, which is probably of animal rather than of human origin.

As a result of this investigation it may be concluded that the water supply of Forestport is obtained from a source which, in its present state, is subject to only accidental, incidental or wilful contamination, due to trespassers on the watershed. If, however, a portion of the watershed tributary to the supply should be purchased by private individuals conditions might develop which would constitute a menace to the supply.

In view of the above it seems advisable to offer the following recommendations to be acted upon by the village authorities:

1. That the advisability of purchasing at least that portion of the watershed in the immediate vicinity of the streams tributary to the supply, in order to adequately protect it from pollution, due to future development, be seriously considered.

2. That, to protect the supply from possible pollution, due either to future developments on the watershed or to the presence of trespassers thereon, application be made to this Department for the enactment of rules and regulations for the protection from contamination of the supply.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 9, 1917

REPORT OF WATER ANALYSIS FOR FORESTPORT

Source	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Impounding reservoir	Tap in village
Collected on	11/2/08	5/24/11	10/11/11	12/10/12	10/24/16	10/24/16
Color	13	30	15	25	.....	10
Odor, hot	.....	.....	.....	.....	.....	3 v.
Odor, cold	.....	.....	.....	.....	.....	3 v.
Turbidity	Tr.	Cl.	Cl.	Cl.	.....	Cl.
Solids, total	74	52	120	60	.....	.....
Loss on ignition	.....	.....	.....	.....	.....	.....
Mineral residue	.....	43	107	47	.....	.....
Ammonia, free	.002	.010	.020	.012	.....	.010
Ammonia, albuminoid	.046	.036	.060	.056	.....	.046
Nitrites	Tr.	.001	Tr.	Tr.	.....	.001
Nitrates	0.20	0.30	0.14	0.14	.....	0.06
Oxygen consumed	2.80	1.40	3.50	4.40	.....	4.50
Chlorine	0.25	0.50	0.37	0.37	.....	0.38
Hardness, total	38.0	41.6	41.6	36.4	.....	41.6
Alkalinity	36.0	40.0	41.0	35.0	.....	37.0
Bacteria per c.c.	120	120	170	70	250	110
B. coli type 10 c.c.	—	—	+	+	0+3—	1+2—
B. coli type 1 c.c.	—	—	—	—	0+3—	0+3—
B. coli type 1/10 c.c.	—	—	—	—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

FRANKLINVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Franklinville, made by Mr. C. M. Baker, assistant engineer, on September 5, 1917.

Franklinville is an incorporated village of 2,065 inhabitants, located in Cattaraugus county, on the Olean-Buffalo Division of the Pennsylvania railroad, about 4 miles southeast of Buffalo. It is on Ischua creek, a tributary to Olean creek and the Allegheny river. The village is provided with a municipal sewerage system and disposal plant.

The water supply is owned by the municipality and controlled by the board of trustees. It was first installed in 1890. Since the original installation, however, wells and a pumping station have been constructed and put into operation as an auxiliary supply. The regular supply is obtained from two groups of springs, one located 2 miles east and the other 6 miles southeast

of the village. The water flows from the springs to the village by gravity, the excess going to a storage reservoir on a hill just east of the village. The well water is pumped directly into the distribution system. Practically all of the inhabitants of the village are served with the water, there being in all some 500 service taps, only a few of which are metered. The average pressure in the village is approximately 75 pounds per square inch. Little definite information could be obtained regarding the consumption, but roughly estimating from the pump records and the yield of the springs, the maximum daily consumption is approximately 300,000 gallons.

The reservoir is located on a hill, about 1½ miles northeast of the village and is constructed by excavation and embankment, the sides and bottom being protected by riprap. The bottom of the reservoir is 72 feet square and the top 100 feet square, its depth is about 13 feet, and its capacity about 700,000 gallons.

The reservoir is protected by a woven wire fence topped with barbed wire, the fence being about 8 feet high. The pumping station is located near the wells, about 1 mile north of the village. It consists of a brick building, in which are located two Smith-Vail triplex double acting pumps, each with a rated capacity of 500 gallons per minute. These pumps are driven by two 35 horse power direct connected motors.

One spring, known as the Gage spring, is located in pasture land about 2 miles west of the village. The spring is protected by a masonry curb about 3 by 10 feet in plan. It is covered by loose boards held in place by stones laid on them. Drainage ditches are provided to divert surface wash, but no land is owned about the spring by the village, nor is a fence provided to prevent access to the immediate vicinity of the spring.

The second group of springs, known as the Scott springs, are located about 6 miles southeast of the village. About 2 acres of land are owned about these springs and this area is enclosed by a fence. Within this area there are several springs which are developed in a similar manner to the Gage spring. They are doubtless subject to surface wash to some extent, since adequate drainage ditches are not provided in all cases. The area about the spring is used as pasture land. There are, however, no buildings in the vicinity and there appears to be no opportunity for pollution of human origin except accidental, incidental or wilful pollution, due to visitors or trespassers in the vicinity.

The wells, three in number, were constructed by sinking 10-inch casings to a depth of about 15 feet, and then within these casings sinking 8-inch pipes to a depth of about 23 feet, the lower end of the inside piping being provided with small openings to admit the water. The space between the two casings is packed to prevent surface wash from finding its way directly into the supply. The stratum consists of a gravelly loam to a depth of about 23 feet, where an impervious clay stratum is encountered. The water is obtained just above the clay. One acre of land is owned by the village about the wells, but this area is not enclosed by a fence. The nearest house, however, is about one-fourth mile distant.

Due to the lack of containers samples of the water could not be collected at the time of the inspection. They were collected later, however, by Dr. C. L. Randall, health officer, and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity, but a water that is somewhat high in hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are moderate, but those for nitrates and chlorine appear to be at times above normal. The bacterial counts are at times high which, however, may be due, in part, to delays in transit because of the uncertain express connections between the village and the laboratory. Colon bacilli are occasionally found in 10 c.c. dilutions, thus indicating the presence of some active contamination, caused probably by surface wash finding its way, either directly or by rapid infiltration through the soil into the springs.

As a result of this investigation, it may be concluded that the public water supply of Franklinville is obtained from sources which if at all times properly

protected should furnish a satisfactory supply. It appears, however, that the springs should be more adequately developed in order to protect them at all times from pollution by surface wash.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That a suitable area about the Gage spring be enclosed by a substantially constructed fence to prevent access of live stock to its immediate vicinity. Furthermore, that a more suitable cover equipped with a lock be provided for this spring.
2. That the Scott springs be more adequately protected by drainage ditches, and that they also be provided with suitable covers and locks.

Finally, I would recommend that copies of this report be sent to the various local officials and to sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 18, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Franklinville...	Cattaraugus...	Tap, public supply	2/26/12	Tr.	Cl.	....	....	133	....	112	.016	.014	Tr.	2.70	0.10	4.25	84.3	80.0	3,100	—	—	—
Franklinville...	Cattaraugus...	Tap, public supply	4/10/12	Tr.	Cl.	....	....	....	....	....	.004	.026	Tr	3.50	0.30	4.50	90.0	85.0	30	+	—	—
Franklinville...	Cattaraugus...	Tap, public supply	9/26/12	Tr.	Cl.	....	....	150	....	120	.062	.054	.001	2.40	0.20	3.75	88.6	88.0	400	+	—	—
Franklinville...	Cattaraugus...	Tap, public supply	11/15/12	Tr.	Cl.	....	....	178	....	163	.004	.034	Tr.	0.60	0.70	1.25	151.4	130.0	375	+	—	—
Franklinville...	Cattaraugus...	Tap, public supply	12/18/12	Tr.	Cl.	....	....	138	....	110	.016	.028	.002	2.10	0.50	3.25	100.0	90.0	3,600	+	—	—
Franklinville...	Cattaraugus...	Tap, public supply	1/26/13	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	—	—	—
Franklinville...	Cattaraugus...	Tap, public supply	2/26/13	Tr.	Cl.	....	....	139	....	....	.022	.036	.001	0.26	0.60	1.25	148.6	131.0	210	—	—	—
Franklinville...	Cattaraugus...	Tap, public supply	4/ 9/13	Tr.	Tr.	....	....	140	....	....	.022	.024	Tr.	0.34	0.40	1.00	111.4	95.0	50	—	—	—
Franklinville...	Cattaraugus...	Tap, public supply	5/27/13	7	3	....	....	192	....	....	.005	.022	.002	0.32	0.20	1.50	142.8	142.0	120	+	—	—
Franklinville...	Cattaraugus...	Tap, public supply	7/16/13	Tr.	Cl.	....	....	144	....	....	.004	.004	.001	1.30	0.50	3.00	87.1	84.0	....	—	—	—
Franklinville...	Cattaraugus...	Gage spring	10/ 1/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2,700	0+3—	0+3—	0+3—
Franklinville...	Cattaraugus...	Scott spring	10/ 1/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1,200	0+3—	0+3—	0+3—
Franklinville...	Cattaraugus...	Well supply	10/ 1/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	600	1+2—	0+3—	0+3—
Franklinville...	Cattaraugus...	Mixed spring and well	10/ 1/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	350	1+3—	0+3—	0+3—
Franklinville...	Cattaraugus...	Tap	10/ 1/17	....	Tr.	....	....	....	....	....	.004	.008	....	0.40	0.30	1.50	105.8	102.0	....	....	....	....

FRIENDSHIP

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an inspection of the public water supply of the village of Friendship, made on April 3, 1917, by Mr. E. S. Chase, assistant engineer of this Department.

Friendship is an incorporated village with a population of 1,218, located in western part of Allegany county on the Erie and the Pittsburgh, Shawmut and Northern railroads, about 40 miles west of the city of Hornell. With the exception of one or two small industries the village is a residential community and a trading center for the surrounding agricultural region. The village is not provided with a public sewer system, the houses being served by privies and cesspools.

The public water supply is derived from springs, 2¼ miles southeast of the village, one driven and one dug well in the southern part of the village, and one deep well, 2½ miles southwest of the village. The waterworks were constructed in 1896, under the direction of Mr. E. D. Smalley, civil engineer. The waterworks were originally owned by a private company, but were later taken over by the village. The supply at first was derived from the springs southeast of the village, but these proving inadequate, the wells in the southern part of the village were developed, and still later the deep well was added to the system. The waterworks are operated under the direction of the board of water commissioners, of which Mr. H. A. Corbin is president.

Practically the entire population of the village is served by this supply, and although no accurate data are available the water consumption may be estimated at approximately 120,000 gallons per day. There are approximately 8 or 9 miles of water mains ranging from 4 inches to 10 inches in diameter. Of the 300 service taps in the village, some 50 per cent are metered. The water from the springs and from the deep well is distributed by gravity, while that from the wells in the southern part of the village is pumped into the mains against the pressure maintained by a reservoir on the side hill one-fourth mile south of the village. The average pressure in the village is about 85 pounds per square inch.

The springs are 8 in number. Five of these springs are located on a side hill pasture back of a farm house 2¼ miles southwest of the village. These springs are developed by stone masonry catch basins covered with flat stone slabs and sealed with mortar. These five springs discharge through pipe lines into a circular collecting basin, thence into a main which in turn discharges into another basin located on a knoll alongside the highway, about 1 mile nearer the village. From this basin the water flows into the main pipe leading to the village. Another spring is located on a side hill, a short distance from this basin and is developed in a manner similar to the other springs. About one-half mile nearer the village a pipe line from two other springs located in a small ravine one-fourth mile west of the highway, enters the pipe line to the village. All of these springs are located in pasture or cultivated ground, or on areas to which cattle have access, and while they seem to be fairly well protected from surface wash, it is possible that at times of heavy rainfall infiltration of surface water carries contamination of animal origin into these springs. This seems particularly probable in view of the fact that in several instances the side walls of the spring basins are not extended above the surface of the ground and that the area around the springs are not fenced to exclude cattle.

Of the two wells in the village, one is a shallow dug well 25 feet deep by 10 feet in diameter, containing 13 feet of water. This well is walled up with masonry and covered with a wooden house. The other well is a drilled well 62 feet deep. The latter well passes through gravel, then clay and then into water bearing gravel. Under normal conditions the water from this well will flow above the surface of the ground. Water from these wells may be pumped into the distribution system at a nearby pumping station, the pumping equipment consisting of one 5-inch by 6-inch Gould triplex pump operated by a gas engine.

Beyond 100 feet and within 500 feet of the wells there are about 6 houses and beyond 500 feet and within 1,000 feet there are about 6 houses. Two or three of the houses nearest the wells are provided with cesspools, the seepage from which enters the gravel of which the subsoil is composed. While the ground water flow is probably under normal conditions away from these wells and towards these cesspools it is possible that at times of heavy draft upon the ground water the flow may be from these cesspools toward the wells, and that under such conditions pollution may reach the wells, particularly the shallow dug well.

The deep well located south of the hamlet of Niles was originally sunk to secure oil, but was abandoned as an oil well. This well has been plugged at 150 feet, and the water flows from it through a pipe tapping the casing 15 or 16 feet below the surface of the ground. It is claimed that the flow now obtainable from this well has been greatly diminished, due to the recent drilling of another oil well 200 feet or so beyond this well. There are no apparent sources of pollution in the vicinity of the well.

At times the supply of water available from the springs and Nile well is inadequate for the needs of the village. At such times pumping from the wells in the southern part of the village is resorted to and at times when the water has been pumped from the driven well in this part of the village, complaints have been made regarding tastes and odors in the water. The water from this latter well is at times apparently saturated with an inflammable hydrocarbon gas, which gives the unpleasant characteristics to the water as delivered to the consumer. On account of the inadequacy of the satisfactory sources of supply the village is considering the development of an additional source or sources of more satisfactory quality. Last fall the drilling of a well on the hillside south of the village was commenced, but never completed.

From a general study of the situation it appears that there are at least four methods or lines of procedure which the village may pursue in its efforts to secure additional water supply, namely: the development of additional springs, the development of additional wells, the use of a surface supply unpurified, or the use of a surface supply purified.

The development of additional springs would probably require the extension of pipe lines to points where such springs might be discovered. It seems probable that sufficient additional springs might be developed in this vicinity at sufficient elevation to give gravity distribution but it also seems probable that such springs would be found scattered over a considerable area, and that the connection of such springs with the present distribution system would render the proposition somewhat costly. While no definite data are available regarding the flow of springs in this region, it is the testimony of several waterworks superintendents in Allegany county that the yield of surface springs has diminished of late years due to the deforestation in this region. Of course, it is impossible for us to state, with the meagre knowledge available, that the development of additional springs is unfeasible, but upon general principles it would seem necessary to proceed along this line very cautiously.

With respect to the development of wells, it may be stated that wells in this vicinity have been drilled which afford satisfactory supplies, but as is true in the development of all ground water sources, the element of uncertainty renders the outcome of such attemps somewhat doubtful. On account of the fact that this region is underlain by oil bearing shale, it is often impossible to predict the character of water which may be obtained from driven wells. In some wells in this vicinity the water has been found to be highly charged with sulphureted hydrogen and consequently decidedly unpalatable for drinking purposes. The drilling of wells on a hillside is ordinarily inadvisable because it is rarely found that such wells will flow at an elevation sufficient to give gravity distribution and consequently no advantage is gained to offset the cost of drilling the extra depth. Under ordinary conditions the proper place to locate wells is in a valley. In the vicinity of Friendship it seems probable that shallow wells sunk into water bearing gravel in the vicinity of Van Campen's creek would afford a supply of water sufficient to supplement the present supply of the village and, provided proper care is taken in

the selection of the location of such wells, satisfactory in sanitary quality. It would, of course, be necessary to pump water from such wells into the mains but as conditions are now such pumping has to be resorted to when the present supply is inadequate.

With respect to the development of an unpurified surface supply it is probable that a surface supply of sufficient purity to afford a satisfactory supply to the village is not available due to the fact that this county is so well populated that almost any stream of adequate flow would drain a populated farming district and would consequently be open to more or less serious and dangerous contamination.

So far as the development of a surface supply with purification is concerned, it may be stated that the possibilities of a supply of this nature can be most easily determined and the cost of construction and the amount of supply to be obtained most accurately estimated prior to actual development.

While the exact method most suitable and most economical for the village is impossible for us to determine with the limited data available and with our inability both on account of limited force and because of lack of authorization to give the requisite time to a detailed study of the problem, it would seem that of the courses above outlined, the choice would lie between the development of additional shallow wells and the installation of a purified surface supply. Under any circumstances, however, the village should secure the services of a competent engineer to study the problem and to report and advise upon the best method from all standpoints for the village to pursue.

Samples of the water from the various sources were collected at the time of the inspection and the results of these analyses together with others made in the past by the Division of Laboratories and Research will be found in the appended table. The previous analyses are manifestly samples of the mixed supply and are of little value in determining the sanitary quality of the water derived from the various sources. The recent analyses, however, indicate that the waters from the Niles well and from the driven well in the village are of a reasonably satisfactory sanitary quality, being low in total numbers of bacteria and with organisms of the B. coli type absent. The latter water, however, is unsatisfactory on account of its unpleasant odor, high color and turbidity. The spring water shows a small amount of contamination probably due to infiltration of surface wash from pasture land. The shallow well water was also somewhat unsatisfactory in physical characteristics and showed comparatively high bacterial counts with organisms of the B. coli type present in 10 c.c. inoculations.

In view of the above facts the following conclusions may be drawn:

1. That the spring supply of Friendship although inadequate in quantity should furnish a supply of satisfactory sanitary quality provided these springs are at all times carefully protected from infiltration of surface wash.
2. That the Niles well furnishes a water of satisfactory quality although the quantity is also inadequate.
3. That the water from the drilled well in the southern part of the village is unsatisfactory with respect to its physical characteristics and the presence of the hydro-carbon gas.
4. That the shallow well furnishes an unsatisfactory supply both with respect to its physical characteristics and its sanitary quality. Furthermore, this well is unsatisfactorily located with respect to nearby cesspools.
5. That the village is undoubtedly in need of an additional supply of satisfactory physical and sanitary quality and of adequate amount.

I would, therefore, recommend:

1. That the masonry side walls of the various springs be extended to at least one foot above the ground level in all cases and drainage ditches be constructed to divert surface runoff from their immediate vicinity and suitable fences be placed around the springs to exclude animals from the area immediately surrounding the springs.
2. That the wells in the southern part of the village, on account of

their unsatisfactory qualities outlined above, be abandoned at the earliest possible moment.

3. That the village retain the services of a competent engineer to prepare plans for the development of additional water supply of satisfactory quality and adequate in quantity.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 11, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT —=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Friendship	Allegany	Tap, public supply	2/24/13	10	20	....	....	....	....	....	.010	.048	.001	0.52	2.40	0.62	40.0	38.0	6,200	+	+	—
Friendship	Allegany	Tap, public supply	4/ 7/13	5	Tr.	....	....	....	....	....	.008	.028	Tr.	0.40	0.80	0.75	36.0	33.0	170	+	—	—
Friendship	Allegany	Tap, public supply	5/26/13	2	Tr.	....	....	....	....	....	.008	.016	Tr.	0.16	0.10	1.5	97.0	92.0	.....	—	—	—
Friendship	Allegany	Tap, public supply	7/14/13	10	2	....	....	....	....	....	.004	.122	.001	0.02	3.00	26.0	73.0	92.0	.....	+	—	—
Friendship	Allegany	Tap, public supply	4/18/14	Tr.	2	....	....	....	....	....	.004	.024	.001	0.36	0.80	0.75	22.0	16.0	19,500	—	—	—
Friendship	Allegany	Tap, public supply	2/27/15	Tr.	Cl.	1 v.	1 v.	24	3	21	.004	.002	.002	0.24	1.50	1.00	18.2	18.0	.....	.....	.....	.....
Friendship	Allegany	Tap, public supply	2/27/15	....	....	....	....	....	....	....	....	....	....	....	....	3.00	.....	.....	350	—	—	—
Friendship	Allegany	Tap, public supply	4/ 6/15	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	.....	275	—	—	—
Friendship	Allegany	Tap, mixed supply	10/24/16	Tr	Cl	3 v.	3 v.	....	....	....	.022	.016	.027	0.10	0.60	40.0	157.2	.....	70	+	—	—
Friendship	Allegany	Tap, spring supply	4/ 3/17	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	.....	3,300	2+1—	0+3—	0+3—
Friendship	Allegany	Tap, Niles supply	4/ 3/17	1	Tr.	1 v.	1 v.	....	....	....	.070	.001	.002	Tr.	0.20	25.5	221.5	195.0	10	0+3—	0+3—	0+3—
Friendship	Allegany	Tap, drilled well in village	4/ 3/17	35	5	2 e.	3 e.	....	....	....	.126	.012	.017	Tr.	0.60	5.0	38.4	38.0	50	0+3—	0+3—	0+3—
Friendship	Allegany	Tap, shallow well	4/ 3/17	20	3	1 m.	3 m.	....	....	....	.080	.008	.006	0.02	1.00	6.6	250.0	102.0	200	3+0—	0+3—	0+3—

GENEVA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon the installation of this Department's emergency sterilization apparatus in connection with the public water supply of Geneva, N. Y.

Following a request from the local health officer, Dr. C. D. McCarthy, and authorization by the board of public works, the emergency apparatus was installed by assistant engineers, E. S. Chase and C. M. Baker and put into operation on November 30, 1917. The public water supply of Geneva, derived from Seneca lake, is subjected to purification by slow sand filters, but owing to insufficient capacity of the purification plant it has been necessary at times to pump raw water into the distribution system. Since July of the present year some 15 cases of typhoid fever have occurred in the city and the evidence given the engineering division points to the water supply as the probable cause of this undue prevalence of typhoid. In order, therefore, to obviate the continued danger arising from the use of the raw water, the installation of the sterilization apparatus of this Department was requested.

The water supply of Geneva is treated by two units of slow sand filters each one-fifth of an acre in area. From the filters the water enters a clear water basin of approximately 500,000 gallons capacity thence to a pump well whence it is pumped to the distribution system, any excess over consumption going to a one million gallon concrete reservoir on a hill south of the city. A complete description of the waterworks system will be found in a report upon an investigation of the supply made by the engineering division in 1914, this report being published in the 35th Annual Report of this Department, Vol. 2, page 336.

The present daily water consumption is approximately 2.2 million gallons while the total capacity of the two filter units is not over 2 million gallons daily, consequently at times it has been necessary to admit raw water into the pump well from which the filtered water is pumped to the city. Furthermore, when one filter unit is cleaned, the reserve storage of filtered water is insufficient to make up for the deficiency brought about by the reduced capacity of the filter plant and it becomes necessary to use a larger proportion of raw water than under ordinary conditions.

The unsafe sanitary quality of Lake Seneca water has been pointed out by this Department at various times in the past. The sewage of Geneva enters the lake at its northern end and, while under normal conditions it probably flows from the lake through the outlet, under certain conditions of wind and lake currents sewage contamination reaches the waterworks intake. This conclusion has been repeatedly confirmed by analyses made by this Department and by chemists employed by the city. Furthermore, prior to the installation of the filter plant, Geneva experienced a continued excess of typhoid fever, this prevalence being materially reduced following the purification of the water supply. During the past summer and fall, numerous analyses made by Mr. Harold Macy, city bacteriologist, indicate the frequent occurrence of organisms of the B. coli type in the water as delivered to the city. Analyses of the filtered water, without admixture of raw water, indicate that the filters have been operated efficiently. It is, therefore, evident that the contamination found in the sample from the distribution system has been due to the mixture of untreated water with the filter effluent. In this connection it is interesting to note that 12 of the 15 cases of typhoid had dates of onset reported as occurring within a period of one month from about the second week in October to the second week in November and that, in the ten days to three weeks incubation period prior to each of these onsets, cleaning of the filters occurred and consequently short periods during which comparatively large amounts of raw water were pumped to the mains. At the time of a cleaning which occurred on September 22, the wind had been from the north and northeast and under such a condition it is conceivable that at this time when considerable quantities of raw water were being used, infection from the city sewage reached the intake.

Early in 1916 the necessity for pumping raw water into the mains was first brought to the attention of this Department. A letter dated February 2, 1916, was accordingly addressed to the mayor advising the installation and operation of a chlorine apparatus for sterilization of the supply in order to avoid the danger arising from the use of raw water. It was also pointed out that provision should be made for the addition of a third filter unit. Similar advice was again given in a letter dated March 11, 1916. Although a third filter unit of 1.5 million gallons daily capacity was contracted for and is now nearing completion, no action was taken towards installing the chlorine apparatus prior to the request for the apparatus of this Department.

Samples of the raw, filtered and chlorinated water were collected after the recent installation of the chlorinator and the results of the analyses of these samples made by the Division of Laboratories and Research will be found in the appended table.

These results show a raw water containing a moderate amount of active contamination as indicated by the occurrence of organisms of the B. coli type in 10 c.c. inoculations. That the filters were operating effectively at the time of collection is shown by the low bacterial counts and absence of B. coli in the samples of filter effluents. Although raw water was being mixed with the filtered water, the analysis of the chlorinated water as delivered to the city shows that the chlorination process was effective in maintaining the supply in a satisfactory sanitary condition.

In view of the above facts the following conclusions may be drawn:

1. That, with the evidence available, it appears probable that the admixture of untreated water with the filtered water has been responsible for an infection of the public water supply of Geneva and for the resultant undue prevalence of typhoid recently occurring.
2. That the installation and operation of the emergency chlorination apparatus of this Department provided a means for rendering safe the mixed supply.
3. That, although the completion of the new filter unit will largely make unnecessary the use of unfiltered water, the installation of a permanent chlorination apparatus would furnish an additional safeguard against the delivery of raw water to the city at times of emergency and would also serve as a valuable adjunct to the filter plant.

I would recommend, therefore, that, as previously advised by us in our letter of 1916, the city install and operate permanent apparatus for the sterilization of the supply, such treatment being available for emergency use and for supplementing filtration.

In conclusion, I would recommend that copies of this report be transmitted to the mayor, the board of public works, the health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 29, 1917

REPORT OF WATER ANALYSES FOR GENEVA

Source	Raw water marked A	Effluent filter No. 1 marked B	Effluent filter No. 2	Filtered and chlorinated marked D
Collected on	11/30/17	.....	.....	.....
Color	0	.....	.....	0
Odor, hot	2 e. and 1 v.	.....	.....	2 e.
Odor, cold	1 e.	.....	.....	1 e.
Turbidity	3	.....	.....	Tr.
Solids, total	.....	.....	.....	.....
Loss on ignition	.....	.....	.....	.....
Mineral residue	.....	.....	.....	.....
Ammonia, free	.006	.....	.....	.002
Ammonia, albuminoid	.040	.....	.....	.034
Nitrites	ab.	.....	.....	ab.
Nitrates	1.0	.....	.....	1.5
Oxygen consumed	.9	.....	.....	.8
Chlorine	66	.....	.....	67
Hardness, total	105.8	.....	.....	105.8
Alkalinity	103	.....	.....	101
Bacteria per c.c	55	5	5	5
B. coli type 10 c.c.	2+0—	0+3—	0+3—	0+3—
B. coli type 1 c.c.	0+3—	0+3—	0+3—	0+3—
B. coli type 1/10 c.c.	0+3—	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

GILBERTSVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Gilbertsville made by Mr. C. M. Baker, assistant engineer, on July 26, 1917.

Gilbertsville is an incorporated village having a resident population of about 450 inhabitants which, however, is increased somewhat during the summer months due to summer residents. The village is located in the easterly portion of Otsego county on Butternut creek. It is 5 miles northeast of Mt. Upton, the nearest railroad station which is located on the New Berlin branch of the New York, Ontario and Western railroad.

The supply was originally put into operation in 1896 and is derived from Dunderberg creek. It was formerly taken from a small impounding reservoir located about 1¼ miles above the village, the only purification being through gravel in the bed of the stream. The report on a previous investigation of this supply by this Department may be found on page 338 of the 29th Annual Report. Due to shortage of water at times, also to its questionable sanitary quality, a new storage reservoir and purification plant has been recently constructed, having been completed and put into operation about September 1, 1916.

The supply is owned and operated by the village under the direction of the board of trustees. From the impounding reservoir, which is located about one-fourth of a mile above the village, the water flows by gravity through slow sand filters located directly below the reservoir, thence to a chlorination plant and distribution reservoir located on a hill just north of the village, from which the water is distributed by gravity through the distribution system. Practically all of the inhabitants of the village are served with the water, there being between 160 and 170 service taps, none of which are metered. The pressure averages about 75 pounds per square inch. According to recent meter readings the consumption ranges from 125,000 to 150,000

gallons per day, an equivalent of 278 or 320 gallons per capita, a very high rate of consumption.

The impounding reservoir is formed by the construction of an earthen dam with concrete core wall across the natural channel of the stream. The capacity of the reservoir is estimated to be about 7,000,000 gallons. About three-eighths of a mile above this reservoir is a second dam which diverts the flow of the stream through an artificial channel discharging below the impounding reservoir and purification plant. The water from the main channel of the stream is controlled by gate valves and is not ordinarily discharged into the storage reservoir, there being numerous springs about the reservoir which under ordinary conditions furnish ample supply. Provision is made, however, whereby water may be drawn directly from the diverting channel to the filters or to the distributing reservoir. The distinguishing reservoir is constructed of stone and concrete, is 40 by 60 feet in plan by 10 feet deep and has a capacity of about 175,000 gallons. It is covered with a wooden roof.

The watershed tributary to the supply has an area of about 4.1 square miles and a total population of about 125 persons which is equivalent to approximately 30 per square mile. The land is used for farming and agricultural purposes. The slopes are in general quite precipitous. Approximately 10 per cent of the area is wooded. The following conditions, indicating the general sanitary conditions on the watershed, were observed at the time of the inspection:

1. At a farm located three-fourths of a mile above the reservoir owned by the Jenson estate and occupied by Edson Harris, the barn and other buildings are located at the top of a steep slope leading to the stream, the barn being about 60 feet distant. The privy is located about 75 feet from the stream and a drain which receives drainage from a sink and also from a cellar passes within 8 feet of the privy, thence to the stream.
2. At a farm 1¾ miles above the reservoir a brook runs between the road and buildings, the house, however, is located about 100 feet from the stream and other buildings about 200 feet distant.
3. At a farm 2¼ miles above the reservoir owned and occupied by Fred Young, the barn is 50 feet from the stream and the barnyard is directly on the stream. The drainage from the gutter back of the cow stanchion leads directly to the stream.
4. At a farm located nearly opposite the reservoir and owned by the J. T. Gilbert estate, a small brook passes between the house and barn. This brook discharges into the diverting channel and is tributary to the supply only in case water should be drawn directly from the diverting channel, as at times when the storage reservoir is being cleaned. Although these premises were not occupied at the time of the inspection, it is obvious that should they be occupied and insanitary conditions maintained, pollution of the supply would result therefrom in case it is necessary to draw directly from the diverting channel.

The purification plant consists of slow sand filters and is supplemented by liquid chlorine sterilization. A screen chamber is located in a control house between the impounding reservoir and the filters. The filters consist of two units of slow sand filters having a total area of .072 acre. The two units are formed by a division wall through the center of the filtration area which is provided with suitable regulating gates. Aeration is provided in one of the filters by means of 7 nozzles which form a spray as the water enters this filter. The filtering medium consists of about two feet of sand resting upon a foot of graded gravel. The sand, according to the specifications, has an effective size of about .4 millimeter. The collecting system consists of a 10-inch main collecting pipe with 8-inch laterals. Both filters are operated continuously, provision being made, however, to clean one at a time. The rate of filtration based upon a consumption of 125,000 gallons per day is equivalent to 1,740,000 gallons per acre per day, and upon a consumption of 150,000 gallons 2,080,000 per acre per day. It has not been necessary to clean

the filters since their installation, it being the intention of the operator to clean the filters once each spring and fall.

The plant for sterilizing the water with liquid chlorine is located in the operating house at the distributing reservoir and was designed by Wallace & Tiernan Co. It consists of a tank in which a chlorine solution is made by filling the tank with water and then discharging a certain amount of chlorine into this water through a diffuser, the amount of chlorine being weighed by scales on which the chlorine cylinder sets. The chlorine solution is then discharged into the supply through an orifice tank provided with a float valve to maintain a constant head. Due to recent rains the door of the operating house had swollen so that it could not be opened at the time of the inspection and the chlorine plant was not then in operation. The solution tank is said to be about 4 by 8 feet in plan by about 4½ feet deep; 18 ounces of chlorine are applied at one time and it requires three days to empty the tank. It is thus apparent that 6 ounces of chlorine are used each day, when the plant is in operation, which is equivalent to about .36 part per million of chlorine when the consumption is 125,000 gallons per day. This amount should be ample for satisfactory sterilization under ordinary conditions.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of these analyses show a raw water somewhat high in color and slightly turbid. The bacterial count is moderate, but colon bacilli were found present in all of the 10 c.c. inoculations and in one of the three each of the 1 and 1/10 c.c. inoculations, thus indicating the presence of active contamination. The results of the analysis of the sample collected from a tap in the village show a colorless and clear water. The bacterial count is high and colon bacilli were found present in two of the three 10 c.c. inoculations, thus indicating that all of the active contamination had not been removed by the process filtration.

As a result of this investigation it may be concluded:

1. That the water supply of Gilbertsville is derived from a source which is subject to considerable pollution by inhabitants and transient visitors upon the watershed;
2. That proper operation of the purification plant should remove the pollution and render the supply satisfactory for potable purposes;
3. That at the time of the inspection, the chlorine plant was not being operated, which was probably in part the cause for the ineffective purification being obtained.

In view of the above I beg to recommend that the village authorities provide more careful supervision of the plant in order that continuous and effective operation of the chlorine plant and filters may at all times be maintained.

Finally I would recommend that copies of this report be transmitted to the local officials and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY N. Y., *October* 18, 1917

REPORT OF WATER ANALYSES FOR GILBERTSVILLE

Source	Influent to filter, raw water	Tap, filtered water, chlorine plant not operating
Collected on	7/26/17	7/26/17
Color	15	0
Odor, hot	0	0
Odor, cold	1 g.	0
Turbidity	2	0
Solids, total	.....	.....
Loss on ignition	.....	.....
Mineral residue	.....	.....
Ammonia, free	.02	.008
Ammonia, albuminoid	.090	.074
Nitrites	0	0
Nitrates	.02	.02
Oxygen consumed	3.3	1.8
Chlorine	.75	.75
Hardness, total	35.1	33.8
Alkalinity	30	32.0
Bacteria per c.c.	400	5,900
B. coli type, 10 c.c.	3+0—	2+1—
B. coli type, 1 c.c.	1+2—	0+3—
B. coli type, 1/10 c.c.	1+2—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

GOWANDA

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report upon an investigation of the sanitary condition of the public water supply of Gowanda made by Mr. C. M. Baker, assistant engineer, on December 5, 1916.

General information

Location.— Erie and Cattaraugus counties, on Buffalo and Southern division of the Erie railroad, 34 miles south of Buffalo. Population: Total, 2,524, all of which are served with the water.

Source of supply.— Present supply, springs located on the hills about the village. Developing new supply from artesian wells.

Consumption.— Roughly estimated at 350,000 to 400,000 gallons daily or an average per capita rate of 150 gallons.

Distribution system.— Gravity supply, 4 miles of mains, 2 inches to 8 inches in diameter.

Service taps.— 500, only a few of which are metered.

Pressure.— 55 to 74 pounds per square inch.

Storage.— Impounding reservoir 3,000,000 gallons, equivalent to one week's consumption.

Purification.— None.

References to previous investigations.— Annual report, vol. 33, page 667, reinspection June 1, 1915.

Due to certain unsatisfactory conditions in reference to the supply the following recommendations were made in the previous report:

1. That all dangerous and undesirable pollution be removed from the public water supply by
   (a) Removing all sources of pollution to a safe distance from the immediate surroundings of all the springs.

(b) Construction of deep and properly graded ditches or cut-off trenches to effectually prevent polluted storm water from passing into the public water supply.

2. That the turbidity in the water caused by the erosive action of heavy rains be corrected by (a) paving the springs and collecting channels and protecting them from surface flow, or (b) passing the whole public water supply through adequately large and suitable settling basins.

3. That owing to the difficulty of protecting the many sources of water supply from organic and possibly dangerous pollution and the expense of installing works for preventing the fouling of the water by suspended matters at certain seasons, the water company investigate other possible sources of water supply with a view to replacing the present sources of supply by some other adequate and unpolluted source whose sanitary quality can be readily controlled.

4. That regular and frequent inspection be made by the Gowanda Water Works Co., of all sources of public water supply for the village in order to prevent any direct and permanent pollution and to minimize the opportunities for accidental or careless pollution of this supply.

Although some attempt has been made by the water company to carry out recommendation No. 1 by improving the sanitary conditions in the vicinity of the springs, it is apparent from this investigation that there still remains a number of sources of pollution. Regarding recommendation No. 2, the superintendent of the water company stated that it seemed impracticable to carry out this recommendation because of the numerous springs from which the supply is derived. The water company, however, has been endeavoring for the past few years to secure a new supply of a satisfactory quality as recommended in recommendation No. 3. They have recently constructed a new artesian well which furnishes a large flow of water and it is expected that additional wells, to be developed, will furnish an abundant supply of a satisfactory quality. During the summer the springs are all frequently inspected in compliance with recommendation No. 4.

The artesian well, which, however, is not yet connected with the system, is located about one-half mile south of the village at the foot of a steep hill. It is 8 inches in diameter by 300 feet deep. The strata through which it is drilled consists of 15 feet of clay and loam, 15 feet of sand and gravel, then clay and fine sand to a depth of 270 feet, the remainder being sand grading into coarse gravel from which the supply is derived. The pipe of the well extended about 8 feet above the surface of the ground at the time of the inspection and the water was flowing freely from it. There are no apparent sources of pollution in the vicinity. A derrick has been erected nearby and work is soon to be begun on the construction of another well.

One reason that the present supply has not been improved, so the assistant engineer was informed, is due to its inadequacy, since at time of drought the supply is somewhat inadequate to meet the demand. The necessity of developing a new supply was therefore apparent and the company did not feel justified in making the expenditure necessary to improve the present supply since it would not furnish sufficient water when developed.

The sanitary conditions of the present supply are substantially the same as described in the previous reports. The most serious condition with respect to pollution appears to be in the vicinity of the Becker springs formerly known as the Bridges springs. At this place farm buildings and a farm yard are located near the edge of the ravine from which the supply is obtained and not far from the springs, the slope of the land being from the buildings toward the ravine. The privy is about 100 feet from the edge of the ravine and the pig pen extends to its edge. The scources of pollution tributary to the McDonald springs and the springs near the reservoir consist of surface wash from pasture land. The Jolls spring which is located about two miles south of the village in a wooded area is apparently not subject to pollution. Aside from this spring, however, all the other sources of supply are subject to more or less pollution, as pointed out above.

Samples of the water were collected from the various sources of supply at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which, together with those of others made since the previous investigations, are recorded in the appended table.

While the results of the analyses of the samples collected from the present supply at the time of this investigation do not indicate active contamination, the sample collected in March of the same year showed a very high bacterial count with colon bacilli present in dilutions as small as 1/10 c.c. thus indicating at that time the presence of considerable active and potentially dangerous contamination. Previous analyses have also indicated that at times the supply is actively contaminated.

The analyses of the samples collected from artesian well No. 1 which is one source of the proposed new supply, show a water somewhat mineral in its character, as is indicated by the high figures for solids, free ammonia and chlorine. The figures for nitrogen in the form of albuminoid ammonia, nitrites and nitrates are low. The water although quite hard appears to be somewhat lower in hardness than that of the present supply. Although the analysis shows the presence of some iron in the water it is not sufficient to cause objectionable tastes and odor and it seems that no trouble should be experienced in this respect unless by continuous pumping from the well the water should become more intensely impregnated with iron. The bacterial count is low and colon bacilli were not found present.

As a result of this investigation it may be concluded:

1. That, as pointed out in previous reports, surface wash from pasture land, barn-yards, etc., and also, probably to some extent, pollution of human origin, at times finds its way into the supply.
2. That the water obtained from the artesian well which it is proposed to use as one source of a new supply, although somewhat high in materials, appeared to be of a satisfactory quality for potable purposes.

As a result of this investigation I beg to offer the following recommendations to be acted upon by the water company:

1. That the work of constructing new wells and developing a new supply be pushed as rapidly as possible and that this supply be put into operation as soon as practicable.
2. That pending the development of the new supply the present supply be protected from pollution by:
   (a) Constructing drainage ditches about the springs to divert surface wash as far from the springs as possible.
   (b) Frequent inspections of the sanitary conditions surrounding the springs and the abatement of all insanitary conditions which might in any way pollute the supply.
3. That when the new supply is put into operation the present supply be abandoned with the possible exception of the Jolls springs and the storage reservoir. If the storage reservoir is retained, however, it should be more adequately protected from surface wash in order to prevent pollution from this source.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *February* 10, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°; 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Gowanda	Erie and Cattaraugus	Tap in village	3/10/15	2	1	1 v.	1 v.	153	9	149	.006	Tr.	.001	1.40	1.80	1.25	140.0	113.0	180	0+3—	0+3—	0+3—
Gowanda	Erie and Cattaraugus	Tap in village	3/25/16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3,600	3+0—	3+0—	1+2—
Gowanda	Erie and Cattaraugus	Becker spring	12/ 5/16	Tr.	3	1 v.	1 v.	244	26	218	Tr.	.014	Tr.	1.60	3.00	2.25	171.4	163.0	110	0+3—	0+3—	0+3—
Gowanda	Erie and Cattaraugus	McDonald spring	12/ 5/16	....	....	....	....	....	....	....	....	....	....	....	....	2.00	....	....	75	0+3—	0+3—	0+3—
Gowanda	Erie and Cattaraugus	Rosenburg spring	12/ 5/16	....	....	....	....	....	....	....	....	....	....	....	....	3.00	....	....	210	0+3—	0+3—	0+3—
Gowanda	Erie and Cattaraugus	Jolls spring	12/ 5/16	Tr.	Tr.	1 a.	1 a.	201	32	169	Tr.	.018	Tr.	1.60	0.70	1.75	148.6	138.0	50	0+3—	0+3—	0+3—
Gowanda	Erie and Cattaraugus	Artesian well No. 1	12/ 5/16	Tr.	2	1 v.	1 v.	313	20	293	.660	.024	Tr.	0.05	1.65	41.0	130.0	218.0	5	0+3—	0+3—	0+3—

GRAND GORGE

HERMANN M. BIGGS, M. D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the sanitary condition of the public water supply of Grand Gorge, made by Mr. M. F. Sanborn, assistant engineer, on August 27, 1917.

General information

Location.— Northeastern part of Delaware county on the U. & D. R. R., 42 miles from city of Oneonta.

Population.— 450; unincorporated.

Waterworks owned by.— Grand Gorge Water Company.

Source of supply.— Bear Kill, intake 1½ miles northwest of village.

Consumption.— No data.

Distribution system.— Gravity through 1¾ miles of pipe, 4 to 6 inches in diameter.

Service taps.— 58; no meters.

Pressure.— 60 pounds.

Storage.— 84,000 gallons.

Purification.— None.

Previous investigations.— 1913, 34th Annual Report, page 610.

The report on the previous inspection pointed out that the public water supply of Grand Gorge was of an unsatisfactory quality and subject to dangerous contamination from several sources. It was, therefore, recommended that the water company either take steps to secure another supply or remove the sources of pollution above the existing intake. From the results of the recent inspection it appears that practically no steps have been taken to carry out our recommendations.

The complete details of the waterworks system will be found in the previous report. The supply is owned and operated by Mr. J. M. Cronk, who purchased the supply about a year prior to the recent inspection.

The watershed of Bear Kill above the intake is about 15 square miles. Upon this area there is a population of about 550, or 37 per square mile. Numerous insanitary conditions exist upon the watershed, privies, cesspools and barnyards being so located as to afford a constant menace to the quality of the supply. Furthermore, the Ulster and Delaware railroad parallels very closely the main stream for several miles and there is accordingly every opportunity for contamination by discharges from the toilets of passenger trains.

At the time of the inspection, samples of water were collected from the supply and the results of the analyses of these samples made by the Division of Laboratories and Research may be found in the appended table.

These analyses show a colored and turbid water of moderate hardness. The figures for nitrogen in its various forms and for oxygen consumed are somewhat high, indicating the presence of decomposing and decomposable organic matter. The total bacterial counts are high and the presence of organisms of the B. coli type in inoculations as small as 1 c.c. show the occurrence of active and potentially dangerous contamination by animal or human excrement.

In view of the above facts the following conclusions may be drawn:

1. That the recommendations of our report on the investigation of 1913 have not been carried out;
2. That the public water supply of Grand Gorge is derived from a source subject to dangerous contamination from privies, from cesspools and from the toilets of railroad trains;
3. That so long as this supply is used for domestic purposes, there exists the strong possibility of outbreaks of typhoid fever and other waterborne diseases.

I would, therefore, recommend:

1. That the Grand Gorge Water Company either abandon the present supply and develop a new supply adequate in quantity and satisfactory in quality or provide means for properly purifying the present supply by filtration supplemented with liquid chlorine sterilization;

2. That, pending permanent improvements, steps be taken by the water company to install at once and properly operate apparatus for the sterilization of the supply with liquid chlorine;

3. That, in order to determine the most feasible method whereby to secure a permanently safe water supply, the water company retain the services of a competent engineer to advise in detail as to the development of such a supply.

4. That, providing the present source of supply be retained, steps be taken to place the watershed in as sanitary a condition as possible and if necessary, apply to this Department for the enactment of rules and regulations for the protection of the supply.

I would further recommend that copies of this report be transmitted to the water company, the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 14, 1917

REPORT OF WATER ANALYSES FOR GRAND GORGE

Source	Bear Kill, above intake	Tap	Bear Kill, above intake	Tap
Collected on	7/2/13	7/2/13	8/27/17	8/27/17
Color	15	.....	20	5
Odor, hot	.....	.....	2 v.	2 v.
Odor, cold	.....	.....	1 a.	1 v.
Turbidity	3	.....	5	Tr.
Solids, total	.....	.....	.....	.....
Loss on ignition	.....	.....	.....	.....
Mineral residue	.....	.....	.....	.....
Ammonia, free	.030	.....	.018	.008
Ammonia, albuminoid	.104	.....	.166	.130
Nitrites	.008	.....	0	0
Nitrates	0.08	.....	0.1	0.1
Oxygen consumed	4.00	.....	3.0	3.1
Chlorine	1.00	.....	1.25	1.25
Hardness, total	37.7	.....	33.8	35.1
Alkalinity	32.0	.....	30.0	30.0
Bacteria per c.c.	7,100	500	57,500	600
B. coli type — 10 c.c.	3+0—	3+0—	3+0—	3+0—
B. coli type — 1 c.c.	1+2—	1+2—	3+0—	3+0—
B. coli type — 1/10 c.c.	0+3—	0+3—	1+2—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

GRANVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the sanitary condition of the water supply of Granville, Washington county, N. Y., made by Mr. Henry Ryon, inspecting engineer in this Department, on November 8, 1917.

General information

Location.— Granville is located in the eastern part of Washington county, adjacent to the state line between New York and Vermont. It is on the D. & H. R. R. about 70 miles north of Albany.

Population.— About 4,000. Practically all of the houses in the village are connected with the public water supply.

Source of supply.— The Mettawee river.

Consumption.— Estimated at about 500,000 gallons per day, or 125 gallons per capita per day.

Distribution system.— The water is pumped directly into the mains, the surplus supply going to a storage reservoir from which the supply is drawn when the pumps are not in operation.

Pressure.— Varies from 90 pounds at the pumping station to 60 pounds in the higher parts of the village.

Storage.— The capacity of the storage reservoir is 1,250,000 gallons, the equivalent of a little over two days' consumption.

Purification.— The water is treated with liquid chlorine.

Reference to previous investigations.— The water supply of the village was investigated in 1912 and a report on this investigation will be found on page 670 of the Thirty-third Annual Report. The supply was reinvestigated on February 10, 1916, and a report covering this reinvestigation submitted to you under date of April 14, 1916. On June 16, 1916, the health officer of Granville notified this Department that there were several positive cases of typhoid in the village; and on June 17 an engineer from this Department was sent to Granville to install a temporary chlorinating plant. A report covering the installation and operation of this plant was submitted to you under date of July 22, 1916.

The water supply of the village is taken from the Mettawee river at a point within the corporate limits of the municipality but above the built-up section of the village. The intake is on the north bank of the river about one-fourth mile above the power dam and pumping station. At the time of the inspection the condition of the river near and immediately above the intake was entirely satisfactory from a sanitary standpoint. The bed and banks of the stream were clean; and, with the exception of a few floating leaves, the water appeared to be free from color, turbidity and foreign material.

From the intake the water flows by gravity to the pumping station. This station is located at the power dam and operated in connection with the electric power station. Two triplex pumps are provided for handling the water. The older pump is a Gould 8 by 12 arranged to be operated either by water or electric power. This pump has a rated capacity of 790,000 gallons per day when operated at 36 R.P.M.; but owing to its condition the slip estimated from the readings of the meter located on the discharge line appears to be approximately 25 per cent. The actual rate of discharge therefore is only about 11.5 gallons per revolution, or 590,000 gallons per 24 hours. The new pump, a Rumsey 14 by 14, is arranged to be operated by electric power only and appears to be in good condition. Making a reasonable allowance for slip, the rate of discharge of this pump when operating at its usual speed of 28 R.P.M. is about 26.5 gallons per revolution, or 1,050,000 gallons per 24 hours. There is no meter on the discharge of the Rumsey pump and although a counter was purchased for the pump several years ago it has never been attached. It would seem advisable that this counter be put in place immediately, as its readings would be of considerable service in checking up the rate of application of the chlorine to the water. Both pumps discharge directly into the city mains, the surplus going to the 1,250,000 gallon concrete reservoir. There is no direct line from the pumps to this reservoir.

The water supply is not filtered but is treated with liquid chlorine applied at a point in the intake line about 15 feet from the pumps and just above where the branch suctions to the pumps connect. A Wallace & Tiernan wet feed apparatus is provided for regulating the rate of application of the chlorine. This apparatus appears to be in good condition and is said to

operate satisfactorily except at times of extreme high water when the vacuum in the suction line with the Gould pump in operation drops so low that the chlorine solution will not feed into the water. There appears to be no reason, if the connections from the apparatus are tight and properly made, why this apparatus should not work under such conditions. Since the river carries more polluting material at times of high water than at times of low, it is important that the necessary repairs be made to this apparatus and its connections without delay. In the meantime, should high water occur, the pumping should be done entirely with the large pump.

At the time of the inspection liquid chlorine was being applied to the water at the rate of about 0.88 pound per 24 hours regardless of the rate at which the water was being pumped. This figure is based on computations made by using the chart furnished by the manufacturers of the apparatus for estimating the flow of chlorine by timing the pulsations of the meter. It was impossible to check this figure by weighing the chlorine cylinder, for although a scale is provided for weighing the cylinder no records of its weight taken at any time could be found, and the date on which the cylinder was put in use was not known. Furthermore, there was no record of the quantity of water pumped or the time during which the pumps had been operated.

Assuming the rate estimated by timing the pulsations of the meter to be correct, chlorine has been applied to the water at the rate of 0.10 part per million with the Rumsey pump in operation and 0.18 part per million with the Gould pump in operation. When the attention of the attendants was called to this obvious error in the rate of application of the chlorine they stated that they knew it to be incorrect but that they were carrying out the instructions of the men who installed the apparatus and the written directions which they had in their possession seemed to bear out their statements.

The rate of application of the chlorine should be at least 0.2 part per million at all times regardless of which pump is in use; and should be increased above this figure during times of high water. Two-tenths of a part per million is equivalent to a rate of 0.98 pound per 24 hours for the small pump and 1.78 pounds per 24 hours for the large pump. Tests of the water made on the day of the inspection when the chlorine was being applied at the above minimum rate of 0.2 part per million indicated an excess of 0.12 part per million of chlorine in the treated water. The counter mentioned above should be attached to the Rumsey pump and a record of the quantity of water pumped should be kept. Likewise a record of the weight of chlorine applied to the water as determined by weighing the cylinder should be kept, and the rate of application of the chlorine computed from these records should be used to check the rate indicated by the pulsometer.

No device is provided for shifting from an empty cylinder to a full one, but since the pumps are not operated continuously the use of such a device does not appear to be necessary.

There were at the time of the inspection six positive cases of typhoid in the village, all located in a small area at the north end of the municipality. The health officer was unable to assign any cause for the outbreak. The milk used by the families in which the cases occurred was delivered by four different milkmen, and apparently there was no other food or drink used in common. Although the families in which the cases of typhoid occurred were located in a small area in one end of the village, it is apparent, from the fact that the available information indicates the public water supply as the only article of food or drink used in common and from the fact that the methods of operation of the chlorine apparatus for disinfecting the supply have not been conducive to satisfactory results, that the water supply may be considered as a possible cause of the outbreak.

Samples of the raw and treated water were taken by the inspector at the time of the investigation and by the health officer four days later. The results of the bacteriological and chemical examination of these samples together with the results of the examination of samples taken in 1916 are given in the appended table. There were at the time the samples were taken positive cases of typhoid in the Minogue and Brayton residences on Pine street and a case in the Albous residence on North street.

The results of the analyses seem to indicate that although the raw water is polluted the treated water usually has a low bacterial count and is generally free from bacteria of the colon type. The difference in the quality of the tap water before and after the installation of the chlorination apparatus on June 19, 1916, and before and after the adjustment of the chlorination apparatus, on November 8, 1917, is very closely indicated by the results of the examinations given in the appended table.

In interpreting these analyses the fact that the treated water has usually been free from bacteria of the colon type should not be taken as conclusive evidence that the small amount of chlorine normally applied to the water will give satisfactory results under all conditions. The raw water on November 8, 1917, the date on which the samples were taken, was very clear and free from polluting matter, and the fact that satisfactory results were obtained then by applying a small amount of chlorine by no means proves that the same quantity would be equally effective under different conditions such as might occur after rain. Experience in other places indicates that generally the quantity of chlorine applied must be increased as the turbidity and organic condition of the water increases.

As a result of this investigation it may be concluded:

1. That the chlorine used for the treatment of the water has not been applied in sufficient quantity and that it has not been applied at a uniform rate.
2. That the turbidity of the water is much greater at times of high water and the rate of application of the chlorine should be accordingly increased at such times.
3. That proper records of the amount of water pumped and the quantity of chlorine applied to the water have not been kept, and that the keeping of such records is necessary for the satisfactory operation of the plant.
4. That the chlorine apparatus does not operate properly under high water conditions.

In view of the above, I beg to offer the following recommendations:

1. That chlorine be applied at all times at the rate of at least 0.20 part per millon.
2. That after rains and at times when the organic content of the water is high the rate of application be increased above 0.20 part per million.
3. That proper records of the amount of water pumped and the weight of chlorine applied be kept and used to check the rate of application of the chlorine to the water.
4. That the necessary repairs or alterations be made to the connections of the chlorine apparatus to secure positive operation of the apparatus at times of high water.

I would further recommend that copies of this report be transmitted to the village authorities with the recommendation that they carry out the suggestions outlined herein.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 6, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Granville	Washington	Tap, public supply	2/16/16	Tr.	3	1 v.	1 v.	161	....	137	.038	.020	.003	0.36	1.40	2.00	85.7	85.0	90	1+2—	1+2—	0+3—
Granville	Washington	Tap, public supply	2/16/16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	130	1+2—	1+2—	0+3—
Granville	Washington	Tap, pumping station	6/18/16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	350	2+1—	0+3—	0+3—
Granville	Washington	Tap, Kibling residence	6/18/16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	250	3+0—	0+3—	0+3—
Granville	Washington	Raw water, Mettawee river	6/20/16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2,050	3+0—	3+0—	3+0—
Granville	Washington	Tap, pumping station	6/20/16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	25	0+3—	0+3—	0+3—
Granville	Washington	Tap, Kibling residence	6/20/16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	50	0+3—	0+3—	0+3—
Granville	Washington	Raw water, Mettawee river	11/ 8/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	300	3+0—	1+2—	0+3—
Granville	Washington	Tap, Minogue residence	11/ 8/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	30	0+3—	0+3—	0+3—
Granville	Washington	Tap, Albous residence	11/ 8/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	0+3—	0+3—	0+3—
Granville	Washington	Tap, Brayton residence	11/ 8/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	0+3—	0+3—	0+3—
Granville	Washington	Tap, pumping station	11/ 8/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	1+2—	0+3—	0+3—
Granville	Washington	Raw water, Mettawee river	11/12/17	0	Tr.	1 v.	2 v.	....	....	....	.006	.042	....	0.40	1.5	1.4	71.4	68.0	160	3+0—	3+0—	2+1—
Granville	Washington	Tap, Minogue residence	11/12/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	0+3—	0+3—	0+3—
Granville	Washington	Tap, Albous residence	11/12/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	0+3—	0+3—	0+3—
Granville	Washington	Tap, Brayton residence	11/12/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	0+3—	0+3—	0+3—
Granville	Washington	Tap, pumping station	11/12/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	0+3—	0+3—	0+3—

NOTE.— The water supply of the village has been treated with liquid chlorine since June 19, 1916.

GREEN ISLAND

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Green Island made on July 3, 1917, by Mr. E. S. Chase, assistant engineer.

Green Island is an incorporated village located in the northern part of the county of Albany on the west bank of the Hudson river opposite the city of Troy. The village is provided with a sewer system which discharges without treatment into the Hudson river.

The public water supply is derived from an infiltration gallery located on an island in the Hudson river between the village and the city of Troy. The supply is subjected to rapid sand filtration and sterilization. The waterworks are owned and operated by the Green Island Water Supply Company of which Mr. W. J. Drummond of New York city is president, and Mr. W. H. Blair local superintendent and manager. The water supply was originally installed in 1888. At that time the supply was operated by a company known as the West Troy Water Works Company, later as the Green Island Water Company and since 1900 by the present company. In 1901 the filter was constructed and put into operation. At one time prior to 1901 a supplementary intake was laid in the river just back of the pumping station, this intake has not been used for years and is now sealed. Another intake from the river is located on the east shore of the island on which the infiltration gallery is located but no water has been pumped directly from the river since November, 1915.

The entire population of Green Island is supplied with the water and about 1,200 in the town of Colonie. A connection exists between the Green Island mains and those of the city of Watervliet, but this connection has not been opened in the past four years. The average daily consumption is approximately 350,000 gallons. Previous to the introduction of meters the consumption was materially higher. There are approximately 12 miles of water mains ranging in size from 4 to 12 inches in diameter. Of the 1,000 service taps some two-thirds are metered. The water is distributed by pumping directly into the distribution system against the pressure maintained by a reservoir located west of the village on a hill in the town of Colonie. This reservoir also serves as storage for the water pumped in excess over consumption. This reservoir is of masonry and brick construction with a diameter of 81 feet, a water depth of 12½ feet and a total capacity of approximately one-half million gallons. The reservoir is covered with a flat wooden roof.

The infiltration well from which the supply is obtained is 115 feet long with horseshoe shape cross section 6 feet high. The invert of this well is located 22 feet below the surface of the ground. The side walls are constructed of loosely laid stone and the arch is of brick. The stratum in which the gallery is located consists of water bearing sand. Above this sand the strata consists of sand and fine gravel and a thin layer of clay. The gallery was thoroughly cleaned in November, 1915, at which time it was found to be nearly full of sand. Prior to that time difficulty had been experienced in securing sufficient water from the gallery to supply the demand. Since then, however, no trouble has been experienced, the estimated yield of the gallery being in the neighborhood of 1,000,000 gallons daily. From the gallery the water enters a receiving well 9 feet in diameter from which it is siphoned to a suction well 20 feet in diameter by 28 feet deep. From this latter well the suction line leads across the river channel to the pumping station.

The pumping station is a brick building approximately 30 by 60 feet in plan. The pumping equipment consists of a low lift 1,000,000 gallon Snow plunger pump, used to raise the water from the suction well to the filters, and 2 high service 1,000,000 gallon Worthington double-acting non-condensing duplex plunger pumps. The Worthington pumps are operated alternately and are so connected that they may serve also as low lift pumps for delivery to the filters. These pumps are operated by steam furnished by two 125-horsepower Erie horizontal return tubular boilers.

The filter plant is housed in a separate building of brick construction approximately 25 by 50 feet in plan. The filter plant consists of 2 gravity mechanical filters of the original wooden tub type manufactured by the New York Continental Jewel Filtration Company. These filters are 16 feet in diameter and consist of two compartments, the lower being a sedimentation and a coagulation compartment and the upper a filter bed comprising 3 feet of sand overlaying 6 inches of gravel underdrained by a manifold system with slotted strainers. The compartments are separated by a false bottom. Both filters are operated at the same time and are in service about 8 hours per day. The capacity of the filters is rated at 500,000 gallons per day each or 110 million gallons per acre per day. With the present daily consumption the rate of filtration is approximately 175,000 gallons per day each or 40 million gallons per acre per day. The water level over the sand is maintained at a depth of about 2 feet. The rate of operation is controlled by a balanced valve rate control of the Jewel type. The filters are cleaned about once a week. The loss of head gauges are out of repair and consequently the loss of head before cleaning is not known. When the filters are cleaned the sand is agitated by mechanical rakes. No data are available regarding the amount of wash water used at each cleaning, the filters being washed until the filtrate runs clear. After washing the filtrate is allowed to run to waste for 8 minutes.

Alum and hypochlorite solutions are applied to the raw water in the suction line of the low lift pump prior to admission to the coagulation compartment of the filters. Alum is applied at the rate of 70 pounds per million gallons or one-half grain per gallon. The hypochlorite is applied at the rate of 22 pounds per million gallons or 0.8 part per million of available chlorine, estimating the strength of the bleach as 33 per cent available chlorine. The apparatus for applying the alum solution consists of three wooden tanks of approximately 1,000 gallons capacity each from which the solution feeds by gravity to an orifice box, thence into a lead pipe leading to the pump suction. The hypochlorite apparatus consists of 2 cast-iron tanks of approximately 300 gallons capacity each from whence it flows by gravity to two orifice boxes which control the flow.

From the filters the water enters a clear water basin constructed of concrete approximately 24 by 36 feet in plan by 8.75 feet deep with a capacity of 50,000 gallons. This basin is located under the filters and is covered by a wooden floor.

The character of the raw water from the infiltration gallery is of a fairly satisfactory sanitary quality save at times when the island upon which it is located becomes flooded by the Hudson river. At such times it is possible that a certain amount of river water seeps into the well bringing about active contamination of the waters thereof. Since the non-use of the auxiliary intake from the Hudson the character of the raw water has been materially improved and the difficulties of securing a satisfactory effluent have been decreased. Analyses of raw and filtered water are made at weekly intervals by Mr. J. T. Caird, chemist and bacteriologist, of Troy.

At the time of the inspection samples of the raw and filtered water were collected and the results of the analyses of these samples together with others made in the past by the Division of Laboratories and Research will be found in the appended table.

The results of the analyses of the raw water in 1914 show a seriously polluted supply, the total bacterial counts being excessive and organisms of the B. coli type being present in inoculations as small as 1/10 c.c. At the time these samples were collected in 1914 it is probable that the supply from the infiltration gallery was being augmented by water from the Hudson for it will be noticed that the raw water collected at the time of the recent inspection was of a decidedly better quality. The results of the analyses of the purified water indicate that the filtration and sterilization plant is effective in bringing about satisfactory purification, the total bacterial counts being moderate and organisms of the B. coli type not being isolated from the 30 c.c. volumes tested.

In view of the above facts the following conclusions may be drawn:

1. That the infiltration gallery tributary to the public water supply of Green Island furnishes a raw water of fair sanitary quality although subject to pollution by the Hudson river at times of high water.
2. That the abandonment of the intakes from the river was in accordance with proper sanitary practice and has resulted in securing a raw water of safer quality.
3. That the purification process if at all times properly operated and controlled should render the supply safe for domestic purposes.

In view of these conclusions there seems to be no necessity at this time to make any recommendations other than that the water company continue to operate the purification plant with care and efficiency at all times.

I would further recommend that copies of this report be transmittted to the local health officer, the Green Island Water Supply Company and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 21, 1917

REPORT OF WATER ANALYSES FOR GREEN ISLAND

Source	Raw water	Filtered water	Raw water	Filtered water	Raw water	Filtered water
Collected on	3/13/14	3/13/14	4/7/14	4/7/14	7/3/17	7/3/17
Color	22	10	15	5	55	.....
Odor, hot	.....	.....	.....	.....	2 v.	.....
Odor, cold	.....	.....	.....	.....	0	.....
Turbidity	3	Tr.	3	10	0	.....
Solids, total	200	198	210	293	.....	.....
Loss on ignition	.....	.....	.....	.....	.....	.....
Mineral residue	174	161	173	220	.....	.....
Ammonia, free	.192	.168	.215	.400	.450	.....
Ammonia, albuminoid	.155	.130	.110	.092	.160	.....
Nitrites	.004	.003	.004	.001	0	.....
Nitrates	0.20	0.24	1.00	1.00	0.20	.....
Oxygen consumed	10.2	7.2	5.8	4.10	5.2	.....
Chlorine	15.25	15.50	13.25	32.00	8.75	.....
Hardness, total	131.4	114.2	120.0	151.0	228.4	.....
Alkalinity	107.0	90.0	108.0	109.4	210.0	.....
Bacteria per c.c.	3,900	10	5,500	9	100	65
B. coli type 10 c.c.	+	—	+	—	2+1—	0+3—
B. coli type 1 c.c.	+	—	+	—	0+3—	0+3—
B. coli type 1/10 c.c.	+	—	+	—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

GREENVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Greenville, made by Mr. C. M. Baker, assistant engineer, on October 15, 1917.

Greenville is an unincorporated village located in the town of the same name in the northern part of Greene county, about 35 miles southwest of Albany and 10 miles west of Coxsackie which is the nearest railroad station. There are a few private sewer systems in the village and most of the houses are served by privies, cesspools, etc. The population of the village is estimated to be about 200.

The water supply is owned by the Greenville Water Company of which Mr. Charles L. Andrus of Stamford is president and Mr. D. E. Powell of Greenville is superintendent. Water is obtained from a small impounding reservoir on a spring fed brook about 1 mile north of the village. From this reservoir the water flows by gravity to the distribution system. About 65 per cent of the population are served with the water, there being in all some 30 service taps, none of which are metered. The distribution system consists of about 1½ miles of mains ranging from 4 to 8 inches in diameter. The pressure is approximately 60 pounds per square inch.

The reservoir is formed by the construction of an earth dam, the upper side of which is riprapped across the bed of the stream. The reservoir is about 50 by 100 feet in size and has a capacity of approximately 225,000 gallons. The water is fed from the reservoir into the main leading to the village through a charcoal filter.

The watershed tributary to the supply is about 1.15 square miles in area and has a total population of about 65 persons or a total of 56 per square mile. The area is used mainly for farming and agricultural purposes, a large portion of the area directly above the reservoir being used for pasture and meadow land. The buildings on the watershed are located well back from the stream and there appears to be little opportunity for direct pollution of human origin. In fact, at the time of the inspection the stream extended only to a spring located about one-fourth of a mile above the reservoir.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of these analyses show a water satisfactory in physical quality with respect to color and turbidity. The figures for nitrogen in its various forms are low. The bacterial counts, however, from all samples collected are rather high and colon bacilli were found present in dilutions as small as 1/10 c.c. thus indicating the presence of considerable active contamination. It is quite probable, however, that this pollution is due principally to surface wash from pasture land.

In view of the above it may be concluded that the water supply of Greenville is derived from a source which is subject to considerable pollution by surface wash from pasture land and possibly to some extent by pollution of human origin due to accidental, incidental or wilful pollution by the inhabitants on the watershed or by visitors thereto.

In view of the above I beg to offer the following recommendations to be acted upon by the water company:

1. That apparatus be provided and that the supply be sterilized with liquid chlorine.
2. That if it seems inadvisable to purify the water in this manner, a new supply be developed from a source free from all sources of pollution.

Finally I would recommend that copies of this report be sent to the water company, to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 29, 1917

REPORT OF WATER ANALYSES FOR GREENVILLE

Source		Spring	Reservoir	Tap
Collected on		10/15/17	10/15/17	10/15/17
Color		.....	.....	10
Odor, hot		.....	.....	1 m.
Odor, cold		.....	.....	2 c.
Turbidity		.....	.....	0
Solids, total		.....	.....	.....
Loss on ignition		.....	.....	.....
Mineral residue		.....	.....	.....
Ammonia, free		.....	.....	.006
Ammonia, albuminoid		.....	.....	.058
Nitrites		.....	.....	.005
Nitrates		.....	.....	.06
Oxygen consumed		.....	.....	2.3
Chlorine		.....	.....	0.75
Hardness, total		.....	.....	114.2
Alkalinity		.....	.....	108.0
Bacteria per c.c.		4,700	3,200	5,700
B. coli type	10 c.c.	3+0—	2+1—	2+1—
	1 c.c.	3+0—	1+2—	1+2—
	1/10 c.c.	1+2—	0+3—	1+2—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct: 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

HALCOTTSVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Halcottsville, Delaware county, N. Y. The investigation of this supply was made on August 6, 1917, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. Charles S. Allaben, health officer, and by Mr. H. L. Hewitt, former superintendent of the water company.

Halcottsville is an unincorporated village in the eastern part of Delaware county and is on the east branch of the Delaware river and the Ulster and Delaware railroad. The population at the time of the inspection was estimated to be about 150, of which about 130 are served by the water supply. There are no private or public sewers in the village, the houses being served by cesspools and privies.

The water supply is owned by the Halcottsville Water Company and the waterworks were constructed in 1910 under the direction of Mr. W. Phinole. The water supply is obtained from a brook passing through Bragg Hollow, the intake being about one-half mile west of the village. There is about 1 mile of water mains varying from 4 inches to 6 inches in diameter. There are about 35 houses in the village, of which 30 are served by the water supply, and of these services none are metered. The supply is distributed by gravity at a pressure of about 48 pounds per square inch. Ten hydrants are placed in various parts of the village for fire protection.

The water is collected in a small intake dam across the brook, then passes to a reservoir a short distance below, and from this reservoir to the mains in the village. Between the intake and the reservoir the water passes through a box about 15 feet long by 4 feet wide and 4 feet deep. This box contains several screens which divide it into several compartments. These compartments were originally filled with sand or gravel or charcoal. At the time of the inspection none of this material was in the box and the screens had become badly clogged and covered with scum. The intake and reservoir had apparently not been cared for for some time.

The reservoir is of concrete about 20 by 50 feet in plan and 8 feet deep and has an "A" frame cover. It has a capacity of about 60,000 gallons, which is equivalent to about four days' supply. The reservoir was comparatively clean at the time of the inspection. The water mains, it is said, have not been flushed out during the last two years, or since the former superintendent, Mr. Hewitt, had resigned from that position.

The watershed above the intake is fairly hilly and has an area of about 3.2 square miles. The water is quite turbid after rainstorms. There are about 14 houses upon the watershed, which represent a total population of about 70 or 80 per square mile. There are several farm houses and barnyards near the stream and also 5 privies from 20 to 75 feet from the stream, most of which were in a very insanitary condition at the time of the inspection.

At the time of the inspection a sample of the village water was collected from a tap and the analysis of this sample will be found in the appended table.

From this analysis it will be seen that at the time of the inspection the water was clear, free from color and comparatively soft. The figures for nitrogen in its various forms are comparatively low. In the bacteriological tests the results are very unsatisfactory, there being a very high total count and organisms of the B. coli group being present in all of the 1 c.c. inoculations tested. This shows that the water was actively contaminated at the time of the inspection, probably from pasture land and from some of the insanitary privies upon the watershed.

From the rsults of this investigation and from the analysis the following conclusions may be drawn:

1. That the public water supply of Halcottsville is derived from an unsatisfactory source, due to the opportunities for pollution from pasture land and particularly from insanitary privies near the brook. Furthermore, the maintenance of the supply has apparently been neglected for the past two years, there being no one, so far as could be determined, who has been responsible for its maintenance during that time.

In view of the above conclusions, I would make the following recommendations:

1. That the Halcottsville Water Company proceed immediately to improve the insanitary conditions upon the watershed, first by securing the removal of all privies to at least 150 feet from the brook or its tributaries and by providing all privies between 150 and 300 feet with tight removable containers in order that the contents thereof may be removed as often as necessary and disposed of by burying at least 500 feet from the brook or its tributaries.

2. That if it is found difficult or impracticable to carry out the above recommendation the water company apply to this Department for the enactment of rules and regulations for the sanitary protection of this supply.

3. That in view of the several houses, barnyards and the pasturing of cattle upon the watershed and the fact that a brook supply like this one is also subject to accidental, incidental or wilful pollution by persons or animals passing over the watershed, it is suggested that the water company consider the advisability of the construction and operation of a satisfactory filter plant in order that all water furnished to the village may be properly purified before being used.

I would further recommend that copies of this report be sent to the Halcottsville Water Company and to the local authorities.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 27, 1917

REPORT OF WATER ANALYSIS FOR HALCOTTSVILLE, N. Y.

Source		Tap in village
Collected on		8/6/17
Color		0
Odor, hot		2 v.
Odor, cold		2 a.
Turbidity		0
Solids, total		.....
Loss on ignition		.....
Mineral residue		.....
Ammonia, free		.003
Ammonia, albuminoid		.104
Nitrites		absent
Nitrates		.2
Oxygen consumed		1.5
Chlorine		.5
Hardness, total		39.0
Alkalinity		28.0
Bacteria per c.c.		189,000
B. coli type	10 c.c.	3+0—
	1 c.c.	3+0—
	1/10 c.c.	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4 decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

HAMILTON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Hamilton made by Mr. C. M. Baker, assistant engineer, on July 24, 1917.

Hamilton is an incorporated village of 1,586 inhabitants located in Madison county on the New York, Ontario and Western railroad, 29 miles southeast of the city of Utica. It is on a tributary of the Chenango river.

The supply is owned by the municipality and controlled by a board of water and light commissioners. It is derived from the outlet of Woodmen pond, a small lake located about 2 miles northwest of the village. The supply was first put into operation in 1895, since when the only improvements have consisted of additions to the distribution system.

From the intake, which is located about 1.2 miles below Woodmen pond, the water flows by gravity to a purification and pumping plant located in the northwestern edge of the village. After passing through the purification plant the water is pumped through the distribution system into a standpipe located on a hill just west of the village. The distribution system consists of about 8 miles of mains ranging in size from 4 inches to 10 inches in diameter. Eighty or eighty-five per cent of the population of the village are served with the water. The consumption averages about 110,000 gallons per day with a maximum of possibly 130,000 to 140,000 gallons in the month of June and a minimum of 80,000 to 85,000 gallons during the winter months. There are in all some 400 service taps, all of which are metered. The pressure in the village averages from 45 to 100 pounds per square inch, depending upon the topography. The intake consists of a flagstone compartment which is protected by a quarter-inch mesh screen and located in the bed of the stream.

The pumping equipment is housed in a brick building and consists of two 750,000-gallon Worthington plunger pumps and 1 compound duplex Worthington pump having a capacity of 430,000 gallons per day. The power is furnished by two 80-horsepower and one 25-horsepower boilers. An electric lighting plant, however, is housed and operated in the same building. It is

planned to abandon the steam plant and put in a producer gas plant in connection with which a centrifugal pump will be provided for pumping the water. The standpipe is constructed of steel, is covered and has a capacity of about 180,000 gallons.

The watershed above the intake has an area of about 3.6 square miles. The area of the lake itself is about .2 square mile. There are in all about 140 inhabitants on the watershed tributary to the supply, which is equivalent to approximately 39 persons per square mile. The land is used for farming and agricultural purposes. That portion lying next to the lake is low and flat but the outer portions of the watershed have steep slopes. In general the buildings are located well back from the streams except one near the outlet of the lake from which the supply is directly obtained. On these premises the house is located about 25 feet from a small pond which discharges into the lake outlet. The barn is about 100 feet distant and the privy and pigpen about 20 feet. Furthermore, the land about the pond is used as a poultry yard. The privy is not provided with a vault and was in an extremely insanitary condition at the time of the inspection. In fact, the general sanitary conditions of the premises were unsatisfactory.

The purification plant consists of a circular slow sand filter 100 feet in diameter and having an area of .18 acre. The water flows by gravity through the filter into a clear water well located below the pumping station, from which it is pumped through the distribution system as stated above. The filter is uncovered and is operated continuously except when being cleaned. During the period of cleaning it is necessary to pump water directly from the intake without purification. Originally the depth of sand and gravel in the filter was about 4 feet. At the present time, however, it is estimated to be approximately 3 feet. The sand has been in service without replacement for about 22 years. No information could be obtained regarding the effective size of the sand. Over the strainers is about 1 foot of graded gravel. The rate of filtration for the average consumption is about 610,000 gallons per acre per day while the maximum probably would not exceed 780,000 gallons per acre per day. These rates are moderate for this type of filter. About 2 feet of water is carried over the sand layer. The rate of filtration is controlled by hand-operated valves.

The filter is cleaned in the spring and fall each year by removing about ¼ inch of sand at each cleaning. The water is drained from the filter and the sand allowed to dry, after which the surface is removed. The total time of cleaning requires from three to four days, during which time no precautions are taken in the village regarding the use of the raw water.

The clear water well is located beneath the pumping station, which is adjacent to the filters. It is 10 feet in diameter by 15 feet deep and has a capacity of about 880 gallons.

Samples of the water were collected at the time of the investigation, the results of the analyses of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but a water that is high in hardness. The figures for nitrogen in its various forms are low, but those for chlorine appear to be somewhat above normal. The bacterial counts are at times high and colon bacilli are occasionally present, thus indicating the presence of active and potentially dangerous contamination.

As a result of this investigation it may be concluded:

1. That the water supply at Hamilton is derived from a source which is subject to pollution from inhabitants located on the watershed tributary to the supply, and particularly from the premises located near the outlet of Woodmen pond.
2. That regarding the process of purification:
   (a) Since only one filter unit is provided, it is necessary to deliver raw water to the village while cleaning the filter.
   (b) Although effective purification of the water can probably be obtained by careful operation of the filter, analytical results indicate that occasionally satisfactory results are not secured.

(c) Due to the continued removal of sand from the filter during the process of cleaning, without replacement, it is possible that an insufficient depth of sand now remains in the filter to produce satisfactory purification.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That a thorough inspection be made of the watershed tributary to the supply and that all insanitary conditions be eliminated, particularly about the premises located near the outlet of Woodmen pond.
2. That should any difficulty be encountered in carrying out the above recommendation application be made to this Department for the enactment of rules and regulations for the protection of the sanitary quality of the supply.
3. That the purification plant be thoroughly overhauled under the supervision of a competent expert, in connection with which additional filter sand of a satisfactory quality should be provided if necessary, and also an additional filter unit should be constructed or the present filter should be divided into two compartments so as to make unnecessary the use of unpurified water during the time of cleaning.
4. That consideration be given to the installation of apparatus for sterilizing the supply with liquid chlorine as an adjunct to filtration.

Finally I would recommend that copies of this report be transmitted to the local officials and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 21, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Hamilton	Madison	Tap, public supply	1/ 3/12	Tr.	Cl.			193		171	.022	.064	Tr.	0.40	0.70	2.50	165.8	164.0	30	—	—	—
Hamilton	Madison	Tap, public supply	2/16/12	Tr.	Cl.			216		190	.012	.050	.001	0.60	0.70	2.00	174.2	172.0	60	—	—	—
Hamilton	Madison	Tap, public supply	3/27/12	Tr.	Cl.			187		167	.004	.042	Tr.	0.48	0.80	2.00	165.8	160.0	250	—	—	—
Hamilton	Madison	Tap, public supply	5/ 2/12	Tr.	Cl.			220		180	.004	.048	Tr.	0.22	0.30	2.00	160.0	158.0	475	+	—	—
Hamilton	Madison	Tap, public supply	9/14/12	Tr.	Cl.			217		192	.002	.018	.001	0.18	1.30	2.00	180.0	145.0	4,200	+	—	—
Hamilton	Madison	Tap, public supply	10/23/12	5	Cl.			205		177	.014	.056	Tr.	0.36	1.10	1.75	162.8	158.0	200	—	—	—
Hamilton	Madison	Tap, public supply	12/ 4/12	Tr.	Cl.			197		164	.023	.062	Tr.	0.30	1.50	2.00	162.8	160.0	200	—	—	—
Hamilton	Madison	Tap, public supply	1/16/13	Tr.	Cl.			188			.012	.050	.001	0.44	1.10	2.00	165.8	158.0	20	—	—	—
Hamilton	Madison	Tap, public supply	2/13/13	Tr.	Cl.			198			.003	.050	Tr.	0.36	0.70	1.62	171.4	168.0	90	—	—	—
Hamilton	Madison	Tap, public supply	3/27/13	Tr.	Cl.			191			.003	.023	Tr.	0.40	0.80	1.50	174.2	159.0	15	—	—	—
Hamilton	Madison	Tap, public supply	5/ 8/13	Tr.	Tr.			198			.004	.024	Tr.	0.46	0.30	1.75	162.8	157.0	250	—	—	—
Hamilton	Madison	Tap, public supply	6/24/13	Tr.	Tr.			193			.004	.014	.001	0.26	0.70	2.00	154.2	144.0	10	+	—	—
Hamilton	Madison	Tap, public supply	5/ 5/14	Tr.	Cl.			196		174	.010	.036	Tr.	0.50	0.80	2.00	168.6	165.0	20	—	—	—
Hamilton	Madison	Creek at intake	7/24/17																600	3+0	2+1	1+2
Hamilton	Madison	Influent to filter	7/24/17		Tr.	2 m.	2 e.				.038	.120		0.20	2.60	2.00	160.0	155.0	100	2+0—	0+3—	0+3
Hamilton	Madison	Filter effluent	7/24/17			1 v.					.003	.032		0.30	1.60	2.00	165.8	157.0	4,200	0+3—	0+3—	0+3—

HERKIMER

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Herkimer made by Mr. C. M. Baker, assistant engineer, on October 26, 1916.

Herkimer is an incorporated village of 10,000 inhabitants located in Herkimer county on the main line of the New York Central Railroad and the Mohawk river. The village is 14 miles east of Utica. There are numerous prosperous manufacturing industries in the village and it is probable that there will be a considerable increase in population in the future. A complete system of public sewers is provided which discharges the sewage without treatment into the Mohawk river.

The water supply is owned by the municipality and is controlled by a municipal commission. The supply was first put into operation in 1888 and is derived from wells in the northeastern edge of the village near West Canada creek, from which water is pumped through the distribution system into a standpipe. Since the original installation additional wells have been drilled and numerous extensions have been made to the distribution system. Due to inadequacy of the present supply, however, the village is now developing a new supply, which will also be discussed in this report.

Practically all of the population is served with the public water supply, there being 1,945 service taps, only 130 of which are metered. The water consumption at the present time averages approximately 1,000,000 gallons daily or an equivalent of 100 gallons per capita. The pressure in the main part of the village is about 70 pounds per square inch but is considerably less in higher sections. The distribution system consists of about 15 miles of mains ranging in size from 3 inches to 8 inches in diameter, a large portion consisting of the smaller sizes, which at times of large consumption results in undue loss of pressure due to pipe friction. At times therefore the working pressure is considerably less than 70 pounds, and for this reason and also on account of the shortage of the present supply the system offers inadequate fire protection. It is only through rigid enforcement of rules and regulations regarding economical use of the water that the present source is now able to supply the needs of the village.

The pumping station, which is located near the wells, also houses a municipal electric lighting plant. The pumping equipment consists of one Knowles compound duplex pump 11 x 18½ x 12 x 12 and a similar pump 12 x 18½ x 10 x 12. In addition to these pumps there are two Knowles vacuum pumps. The standpipe is 60 feet in diameter by 25 feet high and has a capacity of 230,000 gallons.

The wells from which the supply is derived consist of some 30 driven or drilled wells 4 inches in diameter by 20 feet deep and one dug well or collecting gallery about 10 feet wide by 122 feet long. The wells first pass through 10 or 12 feet of a fine yellowish loam and for the rest of the distance through water bearing gravel from which the supply is derived. Below the gravel is a clay stratum. No insanitary conditions were observed in the vicinity of the wells at the time of the inspection. Due, however, to the inadequacy of the supply at times of maximum consumption, water is pumped from West Canada creek onto the ground directly over the wells in order to augment the supply. This method of increasing the amount of water tributary to the wells has been in use for two or three years. The creek intake consists of a submerged concrete gravel-filled channel in the bottom of the stream, so that the water must filter through two or three feet of sand and gravel before it reaches the pumps. From the pumps the water is discharged into a brick manhole which overflows on the surface of the ground. Embankments have been thrown up to retain this water on the area in which the driven wells are located. West Canada creek is subject to considerable pollution both direct and indirect. There are a number of villages along its shores a few miles above Herkimer, some of which discharge sewage directly into the

stream without purification. The water of the creek is therefore undoubtedly contaminated. The extent to which the water is purified in passing through the soil to the ground water tributary to the wells is somewhat indeterminate. It is very probable, however, that this purification is not at all times complete since, due to the heavy draught on the wells, the infiltration of the water is probably quite rapid, and furthermore channels are apt to form along the pipes.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but a water that is very hard. The figures for nitrogen in the form of free and albuminoid ammonia are moderate but those for nitrates and chlorine appear to be above normal, thus indicating that pollution finds its way into the ground water tributary to the supply. In all of the samples up to and including those collected in 1914, the bacterial counts are low and colon bacilli are absent except in one 10 c.c. inoculation. Samples collected in 1916, since water has been pumped from West Canada creek, however, both prior to and at the time of the inspection, showed the presence of considerable active contamination as is indicated by the presence of colon bacilli in 1 c.c. and 10 c.c. inoculations. The limited number of analyses made by this Department under existing conditions however, doubtless do not show the full extent to which pollution may at times exist.

Regarding the present supply, therefore, it may be concluded:

1. That the well supply is insufficient to meet the present consumption.
2. That the distribution system is inadequate for fire protection.
3. That due to the necessity of pumping water from West Canada creek on to the ground for augmenting the present well supply the water is at times contaminated, and cannot be considered safe for potable purposes under these conditions.

Realizing the inadequacy of the present supply, particularly with respect to the limited amount of water and insufficient fire protection, the village has taken steps to secure a new supply. A consulting engineer whose services have been obtained, has made a thorough study of the situation and submitted recommendations regarding the development of this proposed new supply. The village has voted an appropriation of $350,000 for carrying out the plans.

It is proposed to obtain a new supply from Mill creek at a point near Gravesville, about 18 or 20 miles northwest of Herkimer. From the source of supply the water will flow by gravity to a storage reservoir of about 43,000,000 gallons capacity located on high land northwest of the village from whence the water will be distributed by gravity to the consumers. The intake is to be located on Mill creek, at an elevation of about 1,051 feet above sea level, about 1 mile northeast of Gravesville. No storage is to be provided at this place since gaging of the stream and detailed studies of the conditions by the consulting engineer indicate that the flow of the stream is in no case less than 2½ million gallons per day. The watershed directly tributary to this reservoir is 5 square miles in area. A small brook to the north, however, known as Taylor brook, with a watershed area of .81 square mile, and a stream to the south, known as Russia brook, having a watershed of 1.27 square miles, may be diverted into this intake, thus giving a total area tributary to the supply of slightly over 7 square miles. It is estimated that the yield of this total area will in no case be less than 3,000,000 gallons per day and by proper conservation of the supply the yield could be increased to about 6,000,000 gallons daily.

The first portion of the conduit from the intake to the storage reservoir near the village is to consist of 16-inch pipe while the later portion which is at a steeper gradient is to consist of 14-inch pipe. The estimated capacity of this conduit is 3,000,000 gallons daily. The distribution reservoir near the village is to be 25 feet deep and constructed of earth embankments.

Plans are also prepared for improvements in the distribution system. Prior to the development of the plans for the proposed supply a detailed study was made of other sources of supply including the possibility of developing ground water sources and also other surface streams near Herkimer but these plans with the exception of possibly two, namely, purification of West Canada creek water and the development of a supply from White creek were eliminated either on account of inadquate supply, insufficient quantity of water or excessive cost. It was finally concluded that the development of the supply from Mill creek would furnish the most satisfactory water at a reasonable cost.

The watershed from which the proposed supply is to be obtained is used almost entirely for pasture land. Because of the sandy soil a large part of the precipitation on the watershed enters the ground and finds its way into the streams as ground water. This is also indicated by the large yield of the streams during the dry season. There are in all 37 houses on the watershed, 3 or 4 of which, however, were unoccupied at the time of the inspection. The population is probably about 170 persons, an equivalent of 24 per square mile. One house is located on a hill just above the proposed intake at a distance of 300 or 400 feet from the stream. A road also crosses the stream just above the proposed intake. Two other houses are located within 200 or 300 feet of the stream but no insanitary conditions nor cases of direct pollution of the streams were observed at the time of the inspection, other than that from cattle which have free access to the streams tributary to the supply. Most of the houses are well back from the streams and there seems to be little chance of direct pollution from them under normal conditions. A portion of the watershed of Taylor brook is owned by the village.

While the purifying effect of the sandy soil of the watershed would probably be considerable during the summer, except in cases of excessive rainfalls, it is quite evident that during the spring, fall or winter when the ground is frozen considerable pollution from the residences and pasture land on the watershed must find its way into the streams tributary to the proposed supply in addition to that which they receive directly from live stock in pastures and barnyards along the streams. As mentioned above the proposed intake is located just below a road and near a farm house. By extending this intake a short distance up the stream, possibly 1,000 feet, however, it could be placed above this highway and beyond the danger of direct pollution from the farm house.

It is said that the water from these streams is seldom turbid and that its general physical characteristics are very satisfactory. It is proposed therefore to use the water without purification.

Samples of water were collected from Mill creek and Taylor brook at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results being recorded in the appended table.

The results of these analyses show water satisfactory in physical qualities but a water that is somewhat hard, although not nearly so hard as that of the present supply. Figures for nitrogen in its various forms are low but those for chlorine appear to be somewhat in excess of the normal for this locality. The bacterial counts are moderate for surface supplies and B. coli were found present in only one of the three 10 c.c. inoculations of each sample tested. While these analyses indicate a supply of a fairly satisfactory sanitary quality, it is quite probable that samples collected at times of rapid surface run-off would show considerable contamination from the various sources of pollution on the watershed.

Regarding the proposed supply, then it may be concluded:

1. That the proposed source should furnish a satisfactory supply with respect to quantity and physical qualities.

2. That, however, it seems, due to the number of inhabitants on the watershed and the extent to which it is used for pasture land, there is considerable danger of pollution, and that, therefore, the supply should not be used for potable purposes without purification.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. Regarding the present supply: That in view of the possibility of pollution due to the necessity of pumping water from West Canada creek on to the ground to augment the well supply, apparatus be provided and this supply be sterilized with liquid chlorine pending the development of the new or proposed supply.

2. Regarding the proposed supply: (a) That apparatus be installed at a point where the water can at all times be sterilized with liquid chlorine and that this apparatus be effectively operated at all times or (b) that the water be otherwise satisfactorily purified.

The providing of apparatus for the sterilization of the present supply with liquid chlorine would entail no extra expense to the village since this apparatus could later be used for the purpose of sterilizing the proposed supply. It is possible that sterilization of the new supply would render it satisfactory from a sanitary standpoint. If this treatment does not render the water satisfactory, however, more adequate purification by means of filtration or otherwise should be provided.

Should the village encounter any difficulty in maintaining satisfactory sanitary conditions on the watershed of the proposed supply, application should be made to this Department for the enactment of rules and regulations for the protection of the sanitary quality of the supply.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 24, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT —=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Herkimer	Herkimer	Tap, public supply	2/ 3/12	Tr.	Cl.			181		161	.014	.030	Tr.	0.68	2.20	1.62	131.4	125.0	30	+	—	—
Herkimer	Herkimer	Fountain supply	3/20/12	20	Cl.			184		152	.016	.040	.001	0.28	6.20	1.75	128.6	120.0	180	—	—	—
Herkimer	Herkimer	Tap, public supply	5/12/12	5	Cl.			219		197	.004	.032	.001	1.60	2.00	2.75	142.8	127.0	10	—	—	—
Herkimer	Herkimer	Tap, public supply	6/20/12	5	5			227		203	.004	.018	.001	2.40	4.04	3.25	177.2	138.0	40	—	—	—
Herkimer	Herkimer	Fountain supply	9/13/12	15	Cl.			248		217	.002	.024	Tr.	0.52	6.90	2.50	157.2	142.0	70	—	—	—
Herkimer	Herkimer	Tap, public supply	10/11/12																70	—	—	—
Herkimer	Herkimer	Tap, public supply	11/30/12	5	Cl.			218		198	.022	.062	Tr.	0.60	3.60	3.62	165.8	141.0	20	—	—	—
Herkimer	Herkimer	Tap, public supply	2/ 1/13	5	Tr.			258			.004	.028	.001	2.90	2.20	4.75	165.8	156.0	10	—	—	—
Herkimer	Herkimer	Tap, public supply	2/21/13	7	Cl.			224			.012	.040	Tr.	2.00	4.80	3.37	160.0	136.0	40	—	—	—
Herkimer	Herkimer	Tap, public supply	3/27/13	5	Cl.			197			.016	.026	Tr.	1.00	3.50	3.25	140.0	130.0	10	—	—	—
Herkimer	Herkimer	Tap, public supply	6/12/13	Tr.	Tr.			316			.010	.024	Tr.	1.00	5.10	4.00	148.6	135.0	120	—	—	—
Herkimer	Herkimer	Tap, public supply	6/ 5/14	5	1			238		198	.002	.026	.002	2.40	3.30	3.56	157.2	146.0	40	—	—	—
Herkimer	Herkimer	Tap, public supply	9/ 5/16	6	Cl.						.002	.032	.001	0.04	7.60	2.63	131.4	111.0	*23,000	+	+	—
Herkimer	Herkimer	Tap, public supply	10/27/16																15	1+2—	0+3—	0+3—
Herkimer	Herkimer	West Canada creek, at intake																	1,530	3+0—	3+0—	0+3—
		Proposed supply:																				
Herkimer	Herkimer	Mill creek	10/27/16	5	Tr.	2 v.	1 v.	131	15	116	.008	.010	Tr.	0.16	2.00	0.63	85.8	92.0	650	1+2—	0+3—	0+3—
Herkimer	Herkimer	Taylor brook	10/27/16																375	1+2—	0+3—	0+3—

* Samples not iced.

HILTON

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of the village of Hilton, made on January 11, 1917, by Mr. E. S. Chase, assistant engineer, in this department.

Hilton is an incorporated village with a population of 817 located in the northern part of Monroe county on the Rome, Watertown and Ogdensburg division of the New York Central Railroad, about 20 miles northwest of Rochester and 4 miles from Lake Ontario. The village is in the center of a prosperous fruit growing section and contains a large canning factory. There is no public system of sewers, the village being served by privies, cesspools, etc.

The public water supply is derived from Lake Ontario after filtration through a gravity mechanical filter. The waterworks are owned and operated by the municipality under the direction of the board of trustees of which Mr. Myron Roberts is president, Mr. C. F. Walters is superintendent of waterworks. The waterworks were constructed in 1915 and first put into operation on February 7, 1916. The waterworks system was designed by Mr. H. C. Kittredge, civil engineer of Rochester and constructed by contract under his direction.

From the purification plant, located on the shore of Lake Ontario, 3½ miles north of the village, the water is pumped through about 7 miles of water mains at an average pressure of about 65 pounds per square inch. The surplus over consumption is stored in an elevated tower located in the southern part of the village. At the time of the inspection there were 133 service taps all of which were metered. Additional service connections are being made from time to time. During the winter the daily consumption is 25,000 gallons, while from July 1st to December 31st the consumption is about 125,000 gallons per day, due to the fact that the canning factory is in operation during those months and consumes about 100,000 gallons per day.

The intake extends about 400 feet into the lake to a point where the water is about 10 feet deep. The intake pipe is 8 inches in diameter and at the point of intake ends with an upturned T provided with a check valve. It is proposed to extend this intake 400 feet further into the lake to a point where the depth is about 15 feet and where the lake water is less turbid than nearer the shore. The water from the lake flows by gravity to a low lift suction well at the pumping station. From this suction well the water is pumped by a 500 gallon per minute Rumsey centrifugal pump to a reinforced concrete coagulation and sedimentation basin adjacent to the pumping station. Alum is applied to the water in the suction line of the centrifugal pump at a rate of 1 grain per gallon ordinarily and at times 1½ grains. The coagulation basin has a capacity of 4,000 gallons and is baffled both longitudinally and transversely. The basin is cleaned about every three months. From the basin the water flows by gravity upon a single unit gravity mechanical filter of 300,000 gallons per day rated capacity of the New York Continental Jewell type. From this filter the water flows to a filtered water basin with a capacity of 7,000 gallons. After filtration a solution of hypochlorite of lime is applied to the water as it enters the clear water basin at rates ranging from 1 to 2 parts per million.

From the clear water basin the water is pumped by a Rumsey triplex pump direct connected to a 20 horsepower Fairbanks-Morse kerosene engine at the rate of 300 gallons per minute into the distribution system. The pumping equipment has not as yet been provided in duplicate. The standpipe is a covered steel tank of 100,000 gallons capacity, supported by a steel tower 85 feet high.

The general conditions affecting Lake Ontario are well-known, the nearest point of gross pollution being 12 miles distant where the sewage of Rochester enters the lake. Near the filter plant there are about 30 summer cottages along the lake shore, the drainage from them, however, does not reach the lake directly but flows first through low land to the landward of the beach. In

its decision upon the water supply application of Hilton, the Conservation Commission required the village to secure the enactment of suitable rules and regulations for the protection of the waters of Lake Ontario from local contamination in the vicinity of the intake. No application for such rules has yet been made. It is stated that the water of the lake is frequently turbid several hundred feet from shore and that the extension of the intake pipe would give a water less turbid and one more easily treated at the purification plant.

At the time of the inspection samples of raw and treated water were collected and the results of the analyses of these samples, together with a few previous ones made by the Division of Laboratories and Research will be found in the appended table.

The analyses show that the purification plant is effective in removing turbidity and also in producing a water of satisfactory sanitary quality, the bacterial counts of the filtered water being low and organisms of the B. coli type absent.

In view of the above the following conclusions may be drawn:

1. That Lake Ontario at the intake of the Hilton public water supply is subject to local contamination by shore wash, drainage from adjacent lands, by swimming and other pleasure pursuits in summer and possibly at times by the sewage of the city of Rochester.
2. That the purification plant appears to be so designed and operated as to afford adequate purification of the water.
3. That rules and regulations of this Department for the protection from local contamination of Lake Ontario would afford an additional and desirable safeguard.
4. That the extension of the intake pipe would reduce a part of the burden now placed upon the purification plant in view of the fact that the water further out in the lake is probably less turbid than that near the shore.

I would therefore recommend:

1. That the village authorities continue to operate the purification plant with constant care.
2. That, as required by the Conservation Commission, the village make application to this Department for suitable rules for the protection of the water of Lake Ontario from local contamination.
3. That the village extend the intake as soon as it is possible to do so.

I would further recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 7, 1917

REPORT OF WATER ANALYSES FOR HILTON

Source	?	Raw	Filtered	Raw	Filtered
Collected on	10/30/16	11/19/16	11/19/16	1/11/17	1/11/17
Color	.....	.....	.....	5	tr.
Odor, hot	.....	.....	.....	1 a.	1 a.
Odor, cold	.....	.....	.....	1 a.	1 a.
Turbidity	.....	.....	.....	10	tr.
Solids, total	.....	.....	.....	198	.....
Loss on ignition	.....	.....	.....	23	.....
Mineral residue	.....	.....	.....	175	.....
Ammonia, free	.....	.....	.....	.032	tr.
Ammonia, albuminoid	.....	.....	.....	.202	.050
Nitrites	.....	.....	.....	.002	.001
Nitrates	.....	.....	.....	0.06	0.14
Oxygen consumed	.....	.....	.....	3.30	1.40
Chlorine	.....	.....	.....	9.75	9.75
Hardness, total	.....	.....	.....	120.0	122.8
Alkalinity	.....	.....	.....	101.0	91.0
Bacteria per c.c.	90	140	5	*4,300	*15
B. coli type, 10 c.c.	—	+	—	3+0—	0+3—
B. coli type, 1 c.c.	—	—	—	1+2—	0+3—
B. coli type, 1/10 c.c.	—	—	—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

* Sample frozen in transit.

HOLLEY

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Holley made by Mr. C. M. Baker, assistant engineer, on August 1, 1917.

Holley is an incorporated village of 1780 inhabitants, located in the eastern part of Orleans county on the Rochester and Niagara Falls branch of the New York Central Railroad about 30 miles west of Rochester. The village is provided with a municipal sewer system and disposal plant, the latter consisting of Imhoff tanks and sprinkling filters. The effluent from the disposal plant discharges into Sandy creek.

The water supply is owned and operated by the Brockport, Holley Water Company and is derived from springs or shallow wells located 1 to 1½ miles southwest of the village. This supply was first put into service about 1887 and originally supplied both the village of Brockport and Holley. About 3 years ago, however, Brockport installed a municipal supply and bought the interest of the water company in that village. Since this time the water company has supplied only the village of Holley. Practically all of the inhabitants of the village are served with the water, there being in all about 500 service taps, 350 of which are metered. The average water consumption is about 75,000 gallons daily with a maximum of possibly 125,000 and a minimum of 65,000 gallons. These figures correspond to per capita rates of 42, 70 and 36 gallons respectively. The distribution system consists of 5 or 6 miles of mains ranging in size from 4 inches to 10 inches in diameter. The pressure in the village averages about 75 pounds per square inch.

The water from the various springs and wells flows by gravity into a collecting reservoir located near the main pumping station whence it is pumped into the distribution system and standpipe. An old pumping station is still maintained as a reserve equipment. The regular pumping station or station No. 1 consists of a brick building in which are located two Snow pumps each having a capacity of 1,000,000 gallons per day. These pumps are operated either by a water power turbine or by steam from two 75 horse-power boilers. The old pumping station is equipped with two Snow pumps, each having a capacity of 500,000 gallons per day, power being provided by one 75 horse-power

boiler. The standpipe is constructed of steel, is 75 feet high by 24 feet in diameter and has a capacity of about 180,000 gallons.

There are in all four groups of wells or springs as follows:

1. The Clarington wells are located about 1½ miles southwest of the village. Originally there were two of these wells but since discontinuing the Brockport supply the western well supply has been abandoned. The one now in use consists of an "L" shaped infiltration gallery, one wing being 140x8 feet and the other 80x20 feet. The depth of the water in this well at the time of this inspection was about 8 feet. A wooden house and curb are provided over and about the infiltration gallery. The well is located near a small brook and is probably subject to surface wash at times.

2. The Guilden wells are located near the old pumping station about 1 mile southwest of the village. There are 2 wells, one 18 feet in diameter by 20 feet deep. The depth of the water in this well being about 15 feet. It is located in a creek valley about 50 feet from the brook and is at times subject to surface wash. It is protected by a small wooden structure. The second well is located beneath the pumping station which is provided with a wooden floor. The drainage from the floor undoubtedly finds its way into the well.

3. A well 16 feet in diameter by 20 feet deep is located about ⅛ of a mile southeast of the regular pumping station or about 1 mile south of the village. The water in this well rises practically to the surface. It is protected by a stone curb and provided with a wooden roof. There is apparently no opportunity for surface wash to find its way into this well.

4. The Salisbury wells are located in pasture land about ¼ of a mile southwest of the regular pumping station. There are 2 wells each 20 feet in diameter by 18 feet deep with drilled holes in the bottom 65 to 72 feet deep. The water rises in these wells to within about 2 feet of the surface. They are equipped with stone curbs and wooden roofs. Surface wash probably at times finds its way into these wells.

Samples of the water were collected just prior to the time of the inspection by Dr. Padelford, Health Officer, and sent to the Division of Laboratories and Research for analyses. The results of these analyses together with others previously made are recorded in the appended table.

The results of these analyses show a water at times somewhat colored but usually clear, also a water high in hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are moderate but those for nitrates and chlorine are at times somewhat high thus indicating that pollution finds its way into the ground water tributary to the supply. The bacterial counts are at times high and colon bacilli are frequently present thus indicating the presence of active and potentially dangerous contamination. This contamination is probably caused by surface wash which finds its way into the supply due to inadequate development of the springs and wells.

As a result of this investigation it may be concluded:

1. That the Clarington well, one of the Guilden wells and the Salisbury wells are inadequately protected from surface wash and furthermore, that the well located under the old pumping station is subject to pollution by drawing from the floor to the station.

2. That with more adequate development, however, these wells could be satisfactorily protected from pollution.

In view of the above, I beg to recommend that the water company take the necessary steps to adequately develop the wells or springs, from which the supply is derived, in such a manner that surface water cannot find its way directly into the supply.

Finally I would recommend that copies of this report be sent to the water company, to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *August* 23, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Holley	Orleans	Tap, public supply	1/26/12	25	Cl.			375		338	.044	.144	.004	2.00	3.90	9.75	228.5	195.0	1,800	+	−	−
Holley	Orleans	Tap, public supply	3/ 4/12	15	Cl.			330		269	.004	.094	.001	1.70	1.00	7.75	180.0	179.0	2,600	+	−	−
Holley	Orleans	Tap, public supply	4/23/12	Cl.	Tr.			255		220	.004	.026	.001	0.90	0.10	3.25	182.0	148.0	550	+	−	−
Holley	Orleans	Tap, public supply	11/21/12	10	Tr.			312		274	.014	.094	Tr.	1.00	3.50	9.50	264.5	220.0	275	+	−	−
Holley	Orleans	Tap, public supply	1/ 8/13	5	Cl.			276			.014	.040	Tr.	0.70	0.80	4.00	195.0	194.0	300	−	−	−
Holley	Orleans	Tap, public supply	3/ 1/13	Tr.	Cl.			282			.012	.058	Tr.	1.80	2.10	5.50	208.0	183.0	5,000	+	−	−
Holley	Orleans	Tap, public supply	4/12/13	5	2			224			.022	.072	Tr.	1.10	2.50	3.75	195.0	152.0	400	−	−	−
Holley	Orleans	Tap, public supply	5/30/13	Tr.	Tr.			259			.008	.010	Tr.	1.00	0.70	3.62	195.0	182.0	*	−	−	−
Holley	Orleans	Tap, public supply	7/15/13	Tr.	Cl.			282			.004	.020	Tr.	0.80	0.60	3.00	203.0	175.0	200	−	−	−
Holley	Orleans	Tap, public supply	12/12/14	Tr.	Cl.			357		303	.004	.030	.001	1.00	2.00	7.25	285.5	225.0	370	−	−	−
Holley	Orleans	Tap, public supply	2/ 8/16																180	+	−	−
Holley	Orleans	Tap, public supply	12/ 3/16	5	Tr.						Tr.	.018	Tr.	1.60	1.70	7.00	278.5	208.0	*14,000	−	−	−
Holley	Orleans	Tap, public supply	7/30/17		Tr.	1 v.	2 v.				.002	.064	Tr.	1.40	0.90	9.00	240.0	232.0	8,600	3+0−	1+2−	1+2−
Holley	Orleans	Tap, public supply	7/30/17																13,000	3+0−	2+1−	0+3−
Holley	Orleans	Tap, public supply	7/30/17																30,000	3+0−	2+1−	0+3−

* Delayed in transit.

HORNELL

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an examination of the sanitary condition of the public water supply of Hornell made by Mr. C. M. Baker, assistant engineer, on September 10, 1917.

General information

Location.— Steuben county on Erie R. R. and Canisteo river.
Population.— 14,325, practically all being served with the water.
Water Works in Charge of.— Board of Public Works.
Source of Supply.— Impounding reservoirs on Seeley creek, 5½ miles northeast of the city.
Consumption.— Roughly estimated at 1,500,000 gallons per day.
Distribution System.— Gravity.
Service Taps.— 3,500 none of which are metered.
Pressure.— 80 to 85 pounds per square inch.
Storage.— Reservoir No. 1, 40,000,000 gallons; No. 2, 110,000,000 gallons; No. 3, small intake reservoir.
Purification.— Liquid chlorine sterilization, pressure mechanical filters
References to previous reports.— 1908, 29th Annual Report, Vol. 2, page 350. 1909, 30th Annual Report, Vol. 2, page 740. 1913, 34th Annual Report, page 548. 1916, Report under date of August 17th.

At the time of the last preceding investigation certain insanitary conditions existed on the watershed and the operation of the purification plant was also found to be somewhat unsatisfactory, as a result of which the following recommendations were then made:

1. That the city proceed at once to abate all sources of pollution which are violations of the rules and regulations protecting the sanitary quality of the supply.
2. That, regarding the operation of the purification plant:
   (a) Arrangements be made whereby the valves at the reservoirs shall be so shifted as to draw water only from reservoir No. 2, in case of storm.
   (b) That provision be made for continuous attendance during the night and day at the purification plant.
   (c) That a Venturi meter or other method be provided for determining the rate of flow of water in order that the method of purification may be more effectively controlled.
   (d) That scales be provided for determining the amount of chlorine actually applied and that the rate of chlorine application be varied with the water consumption as indicated by the meter to be provided as recommended above.
   (e) That complete records be kept of the operation of the chlorine plant showing these scale readings, the date of connecting each of the chlorine cylinders, the amount of water treated and any remarks or information of interest in connection with the operation of the plant.

Although no inspection was made of the watershed at the time of the recent investigation the superintendent stated that no improvements had been made and it is apparent, therefore, that nothing has been done regarding recommendation No. 1 given above. Certain steps have been taken, however, toward the carrying out of recommendation No. 2 regarding the operation of the purification plant, namely:

(a) The superintendent stated that they have attempted to carry out these suggestions by closing the valve from reservoir No. 1 and thus drawing only from reservoir No. 2 in case of a storm but that vibration of the pressure compensating valve caused such serious water hammer as to make unsafe the use of this method. As a result of this, water is now being drawn from reservoir No. 1 which was not in use at the time of the preceding investigation.

(b) Continuous attendance is now provided for the purification plant, the man regularly in charge living near the plant so that the attendant who is present at night may call him in case any emergency arises.

(c) Arrangements are now being made by the city to install a Venturi meter for measuring the amount of water used.

Nevertheless, other recommendations regarding the operation of the purification plant have not been carried out.

(a) No scales have been provided for weighing the amount of chlorine actually used and thus checking the operation of the apparatus.

(b) No records are kept regarding the operation of the chlorine plant.

Considerable trouble has been experienced during the past summer in operating the filter so as to obtain a clear effluent. It is apparent that the period of detention in passing through the filters after the application of the alum is insufficient to secure complete coagulation as a result of which reaction occasionally takes place after the water has passed the purification plant. Means of eliminationg this difficulty are now being considered by the city officials. A consulting expert with whom they advised, suggested the use of hard alum in the place of that being used at present and the installation of some form of shunt system for applying this alum. Details were not available at the time of inspection and little definite information could be obtained regarding this proposed treatment. It is doubtful, however, whether any coagulant will completely react during the detention period provided by the filters. It is probable, therefore, that the most satisfactory solution of the problem would be to provide a coagulating basin of sufficient size to allow an adequate period of detention to permit satisfactory coagulation and sedimentation. This might be accomplished by constructing a coagulating tank nearby similar to the present clear water storage reservoir, extending the raw water main from the filter to this basin and providing a return pipe from it to the filter. Should this arrangement interfere with the operation of the plant in such a way as to prevent delivering a maximum amount of water to the city in case of emergency, suitable by-pass valves should be provided. The top of the coagulating tank would have to be a few feet higher in elevation than that of the clear water reservoir in order to provide sufficient head on the filters. By this arrangement the present coagulating system could be used and few internal changes would be necessary in the plant.

Considerable difficulty has been experienced in connection with the operation of the chlorine plant due to clogging of the float of the chlorine meter and since no scales have been provided to check the apparatus, little definite information could be obtained regarding the amount of chlorine actually being applied. Cylinders were connected, however, on February 26 and April 9. During this period, therefore, one cylinder of chlorine lasted about 42 days which is equivalent to the application of 2.38 pounds per day and assuming the consumption of 1,500,000 gallons daily is equivalent to approximately .19 parts per million of chlorine by weight. This amount is inadequate to secure satisfactory sterilization of the water. Due to the trouble experienced with the present apparatus the city is now arranging to install a new chlorine plant.

Samples of water were collected at the time of this inspection and sent to the Division of Laboratories and Research for analysis, the results of which together with others made earlier in the year, are recorded in the appended table.

The results of these analyses indicate that effective purification was being secured at the time the samples were collected in February, but that unsatisfactory results were being obtained at the time the samples were collected in June. Analyses of samples collected at the time of this investigation show a raw water with a rather high bacterial count and with colon bacilli present in dilutions as small as 1/10 c.c., a filtered water somewhat lower in bacteria than the raw water but with colon bacilli in all of the 10 c.c. and in 1 of the 1 c.c. inoculations, and a final effluent as indicated by the sample collected from a tap in the city, with a bacterial count higher than in the filter effluent and with the B. coli type as prevalent as in the raw water.

Furthermore, the water collected from a tap in the city was quite turbid. The higher bacterial count and the prevalence of B. coli in the tap water than the filter effluent is probably due to residual pollution, since heavy rains had occurred a few days prior to the time of the inspection, causing a very heavy load on the filters. These unsatisfactory results as pointed out above, are probably due to the lack of proper coagulation and sedimentation and to the fact that insufficient chlorine is being applied to effect adequate sterilization.

As a result of this investigation it may be concluded:

1. That the city of Hornell has only partially carried out the recommendations of the previous report.
2. That ineffective purification is being secured due to:
   (a) Insufficient coagulation because of the lack of adequate sedimentation after the application of the coagulant.
   (b) Inefficient operation of the liquid chlorine plant.

In view of the above I beg to offer the following recommendations to be acted upon by the city authorities:

1. That as recommended in the previous report:
   (a) "The city proceed at once to abate the sources of pollution which are violations of the rules and regulations protecting the sanitary quality of the supply."
   (b) "An arrangement be made whereby the valves at the reservoir shall be so shifted as to draw water only from reservoir No. 2 in case of storm." Due to water hammer caused by the present connection, as discussed above, this will probably necessitate the installing of some other form of valve or of providing some other form of connection.
   (c) "That scales be provided for determining the amount of chlorine actually applied and that the rate of chlorine application be varied with the water consumption as indicated by the meter." In addition to more careful operation of the chlorine plant chlorine should be applied in an amount equivalent to not less than .25 parts per million, and at times of high turbidity a greater amount, possibly as much as .50 parts per million, should be applied.
   (d) "That records be kept of the operation of the chlorine plant showing the scale readings and date of connecting each of the chlorine cylinders, the amount of water treated and any remarks or information in connection with the operation of the plant."
2. That, in addition to the above a suitable coagulating or sedimentation basin should be provided and operated in connection with the purification plant.

Finally I would recommend that copies of this report be sent to the local city officials and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 19, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4 decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Hornell	Steuben	Tap, 206 Main street	2/20/17	5	2	....	1 v.	....	....	....	.040	.064	.002	1.20	0.8	2.8	100.0	93.0	20	0+3—	0+3—	0+3—
Hornell	Steuben	Tap, Young's drug store	2/20/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	0+3—	0+3—	0+3—
Hornell	Sreuben	Tap, police station	2/20/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	0+3—	0+3—	0+3—
Hornell	Steuben	Tap, in city	2/20/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	0+3—	0+3—	0+3—
Hornell	Steuben	Tap, 206 Main street	6/11/17	....	3	2 a.	2 v.	....	....	....	.026	.038	....	0.70	2.8	2.25	44.3	23.0	20	3+0—	1+2—	0+3—
Hornell	Steuben	Tap, Young's drug store	6/11/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	2+1—	0+3—	0+3—
Hornell	Steuben	Tap, police station	6/11/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	40	2+1—	0+3—	0+3—
Hornell	Sreuben	Tap, 176 Broad street	6/11/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	40	3+0—	0+3—	0+3—
Hornell	Steuben	Raw water	9/10/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	500	3+0—	2+0—	2+1—
Hornell	Steuben	Filtered before chlorination	9/10/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	110	3+0—	1+2—	0+3—
Hornell	Steuben	Tap, in city	9/10/17	25	10	1 v.	2 a.	....	....	....	.002	.100	....	0.30	3.9	2.0	52.9	49.0	375	3+0—	3+0—	2+1—

KATONAH

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the public water supply of the village of Katonah, Westchester county. An investigation of this supply was made on December 27, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. W. J. Carpenter, health officer; Mr. H. W. Kellogg, secretary and treasurer of the water company, and Mr. Theodore DeLong Coffin, assistant engineer of the department of water supply, gas and electricity of New York city.

Katonah is an unincorporated village in the northern part of the town of Bedford and of Westchester county. It is on the Cross river, a tributary of the Croton river, and on the Harlem division of the N. Y. C. & H. R. R. It is about 35 miles north of New York city and 15 miles east of the Hudson river. The population at the time of the inspection was estimated at about 1,000.

There are no public or private sewers in the village, excretal and other wastes being disposed of in cesspools and privies.

The water supply is owned by the Katonah Water Company, of which Mr. Clarence Whitman is president and H. W. Kellogg is secretary and treasurer. The waterworks were designed by Mr. Edward Wegmann, civil engineer of White Plains, and were constructed by Mr. D. Barrett of Port Chester in 1898 under the direction of Mr. Wegmann.

The water supply is obtained from a dug well located in the eastern part of the village within about 30 feet of the Croton lake. Water from this well is pumped at a nearby pumping station direct to the mains and to the reservoir on the hillside in the western part of the village. There are 2⅔ miles of water mains varying from 2 to 4 inches in diameter. The average pressure in the village is 40 pounds per square inch. There are about 12 hydrants in various parts of the village for fire protection. About 900 or 90 per cent of the total population are served by this water supply. The average daily water consumption was estimated to be 35,000 gallons.

The dug well is 9½ feet in diameter and 28 feet deep and is covered with a frame roof. The well was dug through sand and gravel and the top of the well is a foot or two above the level of the surrounding ground. Water in the well usually stands a little higher than the water in the lake, although during pumping the water is lowered from 6 to 8 feet and is then considerably below the level of the lake water.

The pumping station located a short distance from the well is a frame building 25½ feet by 22½ feet in plan. The pumping equipment consists of a 7½ x 12-inch pump gear driven by a 15 horsepower Fairbanks-Morse gasoline engine. There is also an 8 horsepower gasoline engine which drives a 7 x 10-inch direct action pump.

The reservoir is a large wooden tank about 23 feet in diameter and 16 feet high covered with a timber roof. It has a capacity of about 50,000 gallons, which is equivalent to about 1½ days' supply. The reservoir or tank is said to be cleaned out twice a year and the water mains are also flushed twice a year.

It is apparent that the water from the well is obtained from both natural ground water and from infiltration of water from Croton lake. This well is located near the upper part of the lake and any pollution received by the lake water above this point might find its way into the water supply of Katonah. Accordingly, only the watershed above this point and the population thereon will be considered in this report. This watershed has an area of 52½ square miles and a population upon it of about 2,200, representing a population of 42 per square mile. Rules and regulations have been enacted for the protection of the Croton water supply and the entire watershed is frequently patrolled by employees of the department of water supply, gas and electricity of New York city, and the sanitary conditions thereon are maintained in an excellent condition. The New York State Reformatory for Women, located at Bedford Hills, has a population of about 450, and sewage from this institution after

passing through a sewage disposal plant consisting of a screen chamber, 3 Imhoff tanks, 8 sand filters and a sterilization plant, is discharged into a tributary of the lake.

At the time of the inspection a sample of the water was collected from a tap in the village and an analysis of this sample together with those previously made by the Division of Laboratories and Research will be found in the appended table.

From the results of these analyses it will be seen that the water is usually clear, free from color and moderately hard. The figures for nitrogen in its various forms are comparatively low, although occasionally the figures for free ammonia and nitrates indicate the presence of organic pollution. The figures for chlorine also are somewhat above normal for this section of the country and are undoubtedly affected to some extent by the population on the watershed. The bacterial counts are generally low, although they have occasionally been somewhat high, indicating pollution. Organisms of the B. coli type have also been occasionally found in 10 c.c. inoculations and twice in 1 c.c. inoculations, also indicating active contamination at the time the samples were taken.

As a result of this investigation and of the analyses, the following conclusions may be drawn:

That the water supply of Katonah is apparently of a satisfactory sanitary quality, due in part to the protection afforded by the rules and regulations for the protection of the New York city water supply insofar as the Katonah supply is obtained by infiltration from the Croton lake and in part to the natural processes of purification to which the ground water tributary to the supply has been subjected.

In view of the above conclusion, it does not seem necessary at this time to make any recommendations save that the village continue to maintain the supply at all times in a satisfactory sanitary condition.

It is further recommended that copies of this report be sent to the Katonah Water Company, to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *March* 27, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Katonah	Westchester	Tap in village	1/19/12	5	Tr.			154		124	.012	.016	.001	1.60	0.10	5.25	122.8	112.0	20	—	—	—
Katonah	Westchester	Tap in village	2/23/12	Tr.	Tr.			165		142	.014	.012	Tr.	1.44	0.20	4.75	117.2	108.0	40	—	—	—
Katonah	Westchester	Tap in village	3/23/12	5	Tr.			153		139	.010	.016	Tr.	1.70	0.20	3.25	100.6	103.0	25	+	+	—
Katonah	Westchester	Tap in village	5/ 3/12	5	Cl.			140		118	.003	.040	Tr.	0.80	0.90	3.25	94.3	94.0	30	+	—	—
Katonah	Westchester	Tap in village	8/30/12	Tr.	Cl.			197		136	.002	.004	Tr.	0.96	0.50	4.50	122.8	117.0	170	+	+	—
Katonah	Westchester	Tap in village	10/18/12	Tr.	Cl.			173		141	.012	.020	Tr.	1.20	0.50	5.75	123.0	122.0	300	+	—	—
Katonah	Westchester	Tap in village	12/19/12	5	10			133		152	.010	.048	.001	1.20	0.60	5.75	131.4	113.0	50	—	—	—
Katonah	Westchester	Tap in village	1/23/13	8	Tr.			169			.016	.072	Tr.	1.70	1.40	5.50	125.8	108.0	10	—	—	—
Katonah	Westchester	Tap in village	2/27/13	5	Cl.			184			.016	.040	.001	1.40	1.10	5.25	125.8	110.0	20	—	—	—
Katonah	Westchester	Tap in village	4/10/13	Tr.	Cl.			172			.016	.014	.002	1.10	0.40	5.50	131.4	105.0	10	—	—	—
Katonah	Westchester	Tap in village	5/22/13	Tr.	Cl.			188			.020	.012	.001	1.40	0.50	5.75	131.4	111.0	10	+	—	—
Katonah	Westchester	Tap in village	7/ 1/13	Tr.	Cl.			191			.008	.008	.001	1.80	0.40	6.25	122.8	113.0	.....	+	—	—
Katonah	Westchester	Tap in village	3/18/14	5	2			212		165	.170	.088	.001	2.40	6.32	8.25	140.0	110.0	40	—	—	—
Katonah	Westchester	Tap in village	12/27/16	5	3			260	55	205	.016	.030	.003	3.60	1.20	16.50	180.0	146.0	15	0+3—	0+3—	0+3—

KINGSTON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the sanitary condition of the public water supply of the city of Kingston made by Mr. C. M. Baker, assistant engineer, on October 16, 1917.

General information

Location.— On the west side of the Hudson river, 53 miles south of Albany.

Population.— 26,354, all of which are served with the water.

Waterworks in charge of.— Board of water commissioners.

Source of supply.—Saw Kill, a small stream rising in the Catskill mountains with a catchment area of about 33 square miles.

Consumption.— High service 2,720,000 gallons daily, low service 2,005,000, a total of 4,725,000 gallons, or 179 gallons per capita per day.

Distribution system.— Distribution is by gravity throughout, there being a high and low level system, each of which is served by a separate reservoir.

Service taps.— Estimated at 5,500.

Pressure.— 40 to 100 pounds per square inch, depending upon the topography.

Storage.— Reservoir No. 1 (low service), 65,000,000 gallons; reservoir No. 2 (high service), 45,000,000; reservoir No. 3 (Cooper lake or storage reservoir), 450,000,000; reservoir No. 4 (emergency reservoir), 70,000,000; total, 630,000,000 gallons.

Purification.— Mechanical pressure filters and sterilization with hypochlorite of lime.

References to previous investigations.— 1910, page 560 of 31st Annual Report; 1915, page 457 of 36th Annual Report; Rules and Regulations, 1911, page 690, 32d Annual Report.

This present investigation of the water supply was made subsequent to the occurrence of some 18 cases of typhoid fever in Kingston. An investigation of this outbreak by Dr. Laidlaw, sanitary supervisor, indicated the possibility of an infection of the public water supply at a time when unpurified water was being delivered to the city for a short period during the month of August. In this connection it may be noted that the onsets of the majority of the cases were between the 4th and 15th of September.

At the time of the last investigation the purification plant was operating efficiently and the supply appeared to be in a satisfactory condition, as a result of which no recommendations were then made. Due to the rather high rates of filtration, however, the city installed 4 additional filters during the past summer, thus increasing the total number of units from 12 to 16. During this construction work, which necessitated the making of alterations in the pipe connections with existing filters, raw water was delivered to the city for a time during the month of August. This matter, however, will be discussed more in detail later in this report.

The watershed from which the supply is obtained lies principally on the southern slope of the Catskill mountains. Its northern portion is steep and rocky but its southern portion is less steep and is used largely for agricultural purposes. The resident population of this watershed is about 1,000, which is equivalent to about 26 per square mile. Practically all of this population, however, is located in the southern portion of the watershed, thus much increasing the density of the population in the vicinity of the reservoirs from which the supply is directly obtained. The region is largely used as a summer resort as a result of which the population is much greater during the summer than during the winter months. The hamlet of Woodstock is located about 1½ miles above the upper reservoir and has a population of possibly 200 persons. Most of the houses in this community are located close to the stream. At Bearsville, about 3½ miles above this reservoir, there is a population of 50 or 60 persons, while at Shady, 5½ or 6 miles above it, there are

probably 125 or 130 persons. In all of these places the buildings are located in the valley close to the stream. The lower reservoir is fed by the overflow from the upper reservoir and by a small tributary stream extending into the mountains on the eastern edge of the watershed.

The following insanitary conditions, some of which are violations of the rules and regulations enacted by this Department for the protection of the sanitary quality of the supply, were observed at the time of the inspection and indicated in a general way the condition of the watershed at the places mentioned above:

1. At Shady, 5½ miles above the upper reservoir, there are 2 privies provided with wooden boxes, each of which was full. One is located 30 and the other 125 feet from the stream.

2. At Bearsville, 3½ miles above the upper reservoir, is a privy, provided with a wooden box, located 35 feet from the stream.

3. At Woodstock, 1½ miles above the upper reservoir:

(a) A privy, provided with a removable wooden box which was full, is located on a steep slope 40 feet from the stream.

(b) A privy, with wooden removable box half full, is located 22 feet from the stream.

(c) A double privy located 45 feet from the stream is provided with pails which, however, are too small. Fecal matter was noticed on the ground at this place. The ground between the privy and the stream was practically level.

(d) A privy, provided with no vault, is located 8 feet from the stream. The ground is level.

(e) A privy, with a wooden box is located 30 feet from the stream.

(f) Two privies of an art studio are located about 10 feet from the stream. They are, however, provided with concrete vaults which are apparently water tight.

(g) At the Scribner property, a privy with no vault, and a pigpen are located about 30 feet from the stream.

It is apparent from the above that numerous opportunities for contamination of the stream exists only a short distance above the upper reservoir. The period of detention in this reservoir depends not only upon the water drawn from it for supplying the city, but also upon the flow of the stream entering it. Furthermore, under certain conditions, currents in the lake may practically eliminate the purifying effect of storage by carrying pollution directly to the intake.

The purification plant has been described in detail in previous reports and, therefore, will not be fully discussed here. The only alteration since the previous inspection is the 4 additional filters mentioned above as a result of which the rate of filtration has been reduced from 136,000,000 gallons per acre per day to about 102,000,000 gallons. This decrease in rate of filtration should increase the efficiency of the plant. The hypochlorite and alum are applied by separate pumps, there being a third pump in reserve in case one should break or in case it is necessary to shut one down for repairs. Alum was applied in the high service system during the month of July, 1917, at rates ranging from .20 to .31 grain per gallon, averaging about .29, while in the lower service system the minimum was .08 and maximum .40, and the average .26 grain per gallon. During this same period hypochlorite was applied to the water in the high service system at rates ranging from .09 to .23 and averaging .18 part per million availing chlorine, while in the low service the corresponding rates were .07 to .22, and .16 part per million. It is probable that the amounts of hypochlorite mentioned above, are insufficient to secure adequate sterilization at all times.

Due to the alterations in connection with the installation of the additional filter, as stated above, it was necessary to shut down the operation of the purification plant. A notice was, therefore, published in the local papers on August 13, for all people in the down town section or those tributary to the low level system to boil the water on August 14 and 15. A later notice advised boiling the water from the high service system on August 16 and 17,

and a still later notice to boil the water in all parts of the city for 3 days following August 22. During a portion of these periods, raw water was delivered into the city distribution system. The possibility of infection of the streams tributary to the supply has been pointed out above, also the possibility of the infection finding its way to the intake. It is obvious, therefore, that if the process of purification is interrupted, infected water might under certain conditions find its way into the distribution system and thence to the consumers.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of the analyses of samples of water collected from the high service system show a raw water high in bacteria, with colon bacilli present in all 3 of the 10 c.c. inoculations, and in one of the three 1/10 c.c. inoculations. The filter effluent shows a moderate bacterial count with colon bacilli as prevalent, however, as in the raw water, while the filtered and chlorinated water collected from a tap at the plant show no reduction either in the number of bacteria nor in the occurrence of bacteria of the B. coli type. The sample collected from a tap in the city, however, shows a moderate bacterial count with none of the B. coli type present in the inoculations tested. The analyses of samples from the low service system show a high bacterial count in the raw water with the B. coli type present in all 3 of each 10 c.c. and 1 c.c. inoculations. Samples of treated water collected from a tap at the plant and also in the city show moderate bacterial counts with no colon bacilli. The results of these analyses, therefore, indicate raw waters actively contaminated in each of the supplies, and that this contamination was not being effectively removed by the high service purification system. This ineffective purification is probably due, in part at least, to the fact that insufficient hypochlorite was being added to adequately sterilize the water.

As a result of this investigation it may be concluded:

1. That the watershed from which the Kingston water supply is derived is somewhat thickly populated, particularly in the vicinity of the streams directly tributary to the upper reservoir, and furthermore, that there are a number of insanitary conditions which might, under favorable conditions, cause contamination of the untreated supply. There is also the possibility of accidental, incidental or wilful pollution and even infection by residents and transient visitors upon the watershed.
2. That during the period from August 14 to August 22, 1917, untreated water was delivered into the city distribution system.
3. That insufficient hypochlorite was being applied at the time of the inspection to secure adequate sterilization of the water.

In view of the above, I beg to offer the following recommendations:

1. That a careful sanitary survey be made of the watershed and that all insanitary conditions or violations of the rules and regulations be abated.
2. That hypochlorite be applied at all times in amounts sufficient to furnish available chlorine equivalent to not less than .25 part per million, and that this amount be increased at times of high turbidity or when there is a heavy load upon the filters.
3. That in case it is at any time again necessary to deliver unfiltered water to the city provisions be made to treat this water with liquid chlorine or hypochlorite.

I would further recommend that copies of this report be transmitted to the city authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *November* 7, 1917

REPORT OF WATER ANALYSES FOR KINGSTON

SOURCE	HIGH SERVICE				LOW SERVICE		
	Raw	Effluent filter No. 16	Filtered and chlorinated water	Tap in city	Raw	Filtered and chlorinated water	Tap in city
Collected on	10/16/17	10/16/17	10/16/17	10/16/17	10/16/17	10/16/17	10/16/17
Color	10	.....	.....	0	25	.....	10
Odor, hot	2 v.	.....	.....	2 v.	2 v.	.....	2 v.
Odor, cold	3 v.	.....	.....	3 v.	3 v.	.....	3 v.
Turbidity	5	.....	.....	0	5	.....	0
Solids, total	.....	.....	.....	.....	.....	.....	.....
Loss on ignition	.....	.....	.....	.....	.....	.....	.....
Mineral residue	.....	.....	.....	.....	.....	.....	.....
Ammonia, free	.008	.....	.....	.004	.004	.....	.006
Ammonia, albuminoid	.064	.....	.....	.036	.116	.....	.086
Nitrites	Tr.	.....	.....	0	Tr.	.....	0
Nitrates	.06	.....	.....	.06	.02	.....	.10
Oxygen consumed	1.7	.....	.....	1.1	2.4	.....	2.0
Chlorine	2.0	.....	.....	2.25	1.5	.....	1.75
Hardness, total	23.4	.....	.....	22.1	24.7	.....	27.3
Alkalinity	17.0	.....	.....	22.0	20.0	.....	21.0
Bacteria per c.c.	350	70	70	60	900	85	75
B. coli type 10 c.c.	3+0—	3+0—	3+0—	—	3+0—	—	—
B. coli type 1 c.c.	0+3—	0+3—	2+1—	—	3+0—	—	—
B. coli type 1/10 c.c.	1+2—	1+2—	0+3—	—	0+3—	—	—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

LARCHMONT

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the examination of the sanitary condition of the public water supply of Larchmont, made by Mr. C. M. Baker, assistant engineer, on May 10, 1917.

General information

Location.— Westchester county, on the New York, New Haven and Hartford railroad, 19 miles from New York city.

Population.— 2,060, all of which is served with the water.

Source of supply.— Shelldrake river, with a drainage area of 2½ square miles.

Consumption.—About 300,000 gallons daily.

Distribution system.—About 10 miles of pipe ranging from 4 to 12 inches in diameter.

Taps.—Approximately 425, all of which are metered.

Pressure.— 30 to 50 pounds per square inch.

Storage.— Impounding reservoir, 95,000,000 gallons.

Purification.— Pressure mechanical filters, alum being used part of time and sterilization with liquid chlorine.

Reference to previous reports.—Annual Reports, 32d, page 657; 33d, page 696. In addition to which reinspection reports were transmitted under dates of January 15, 1915, and August 17, 1916.

At the time of the last preceding investigation it was pointed out that certain unsatisfactory conditions existed, as a result of which the following recommendations were then made:

"(1) That as recommended in the previous report:

(a) 'The Larchmont Water Company apply to this Department for the enactment of rules and regulations for the sanitary protection of the water supply.'

(b) 'That the water company resume the regular analyses of both raw and treated water.'

2. That the use of alum in connection with the operation of the filtration plant be resumed.

3. That the by-pass be eliminated in order that raw water may at no time be discharged into the distribution system and that, if necessary, additional filters be provided in order that adequate filtering capacity may be available in case of excess consumption at times of fire and, furthermore, pending these changes or improvements, steps be immediately taken to provide the necessary connection in order that the raw water may be chlorinated, if any time it should be necessary to by-pass the filter plant."

As a result of this investigation it was learned that none of these recommendations have been carried out. Scales have been provided, however, for determining the actual amount of chlorine used and thus checking the operation of the apparatus, and complete records are now being kept of the operation of the plant. Although alum was not being applied at the time of the inspection and had not been used for some time prior thereto, the engineer was informed that its use had been discontinued because of necessary repairs to the pipes connecting with the "alum pot." It appears, however, that the repairs could and should have been made sooner. Aside from these changes the supply remains the same as at the time of the previous investigations and, therefore, will not be covered in detail in this report.

The danger of pollution of the supply from the population on the watershed has been pointed out in previous reports. Although the watershed is at the present time somewhat sparsely settled, it is probable that with additional developments of new territory being opened up, there will be considerable increase in population in the near future. It seems necessary, therefore, that careful supervision be maintained over the sanitary conditions on the watershed at all times.

At the time of the present inspection there were numerous complaints regarding taste and odor in the water, described as a fishy odor. Samples of the water were, therefore, collected from the reservoir at the time of the inspection and later examined microscopically and found to contain large numbers of algae of the Protozoa type, known as Uroglena. These organisms have been known to cause fishy tastes and odors in reservoirs on numerous occasions and it seems quite probable that they are the cause of the present disagreeable odor in the Larchmont water. This odor was particularly noticeable about the reservoir at the time of the inspection. Treatment of the water with copper sulphate would probably obviate this unsatisfactory condition. According to investigations by K. F. Kellerman of the Bureau of Plant Industry, United States Department of Agriculture, copper sulphate may be applied to the water in amounts equivalent to 1.2 pounds per million gallons of water without killing trout, and larger amounts may be applied without injuring other classes of fish. Uroglena, the type of algae found present in the Larchmont reservoir, may be killed by the use of .4 pound of copper sulphate per million gallons. It seems, therefore, that the application of copper sulphate to the water in the reservoir in an amount equivalent to about 1 pound per million gallons would eliminate the algae and not injure the fish present in the water. Although the presence of algae in the water probably does not injure its sanitary quality it does seriously affect its physical qualities, and is very unsatisfactory from an aesthetic standpoint.

At the time of the previous investigation liquid chlorine was being applied to the water at a rate of .36 part per million. At the time of this investigation, however, only one-third of this amount was being applied or .12 part

per million. The records of operation showed that by acutal weight 4 to 4½ ounces of chlorine per day were being applied, while the chlorine meter of the apparatus showed about three times this amount or an amount equivalent to that which was formerly applied. Upon inquiry being made of the treasurer of the water company as to why the amount of chlorine had been reduced the treasurer informed the engineer that he considered it unnecessary to apply the amount which was formerly being used, namely, .36 part per million. He stated that he thought he at times detected an odor of chlorine in the water and wished to eliminate this condition. The experience of this Department in connection with the operation of other plants, however, indicates that satisfactory disinfection cannot be secured at all times with less than .25 to .30 part of chlorine per million.

Samples of the water were collected at the time of the investigation and sent to the Division of Laboratories and Research for analyses, the results of which together with those collected at the time of the previous investigation are recorded in the appended table.

The bacteriological results of these analyses show a substantial reduction in the number of bacteria by the process of purification at the time of the previous investigation, when .36 part per million of chlorine were being used, but only a slight reduction at the time of this investigation, when only .12 part of chlorine was being applied. Furthermore, the latter results show the presence of colon bacilli in the treated water. These results bear out the statement made above that effective purification cannot be obtained with this small amount of chlorine.

As a result of this investigation it may be concluded:

1. That the water company has not carried out the recommendations made by this Department in the previous report.
2. That insufficient chlorine was being applied to the water at the time of this investigation to secure effective purification.
3. That considerable trouble is being experienced from tastes and odors in the water caused by algae in the reservoir.

In view of the small amount of chlorine that was being applied to the water at the time of this inspection, and also of the disagreeable taste and odors then existing, a letter was sent to the water company soon after the inspection, pointing out these unsatisfactory conditions and suggesting improvements. Since other unsatisfactory conditions existed, however, I beg to offer the following recommendations to be acted upon by the water company, which include also the suggestion contained in the latter mentioned above.

1. That the recommendations of the previous report regarding the early enactment of rules and regulations protecting the sanitary quality of the supply, regular analyses of the water, the use of alum in connection with filtration and elimination of the by-pass be completely carried out.
2. That regarding the operation of the chlorine plant not less than .25 or .30 part of chlorine per million be applied at all times.
3. That, to eliminate the algae, copper sulphate be applied to the reservoir in an amount equivalent to not less than one pound per million gallons of water, and that if the first treatment does not produce satisfactory results a second application be made.

Finally, I would recommend that copies of this report be transmitted to the water company, to the local health officer, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 23, 1917

REPORT OF WATER ANALYSES FOR LARCHMONT

Source	Raw water	Effluent N. filter	Effluent S. filter	Final effluent	Raw water	Final effluent
Collected on	5/9/16	5/9/16	5/9/16	5/9/16	5/10/17	5/10/17
Color	8	.....	.....	5	.....	20
Odor, hot	3 v.	.....	.....	3 a.	.....	2 v.
Odor, cold	3 v.	.....	.....	3 a.	.....	3 f.
Turbidity	2	.....	.....	Tr.	.....	2
Solids, total	70	.....	.....	83	.....	.....
Loss on ignition	6	.....	.....	10	.....	.....
Mineral residue	64	.....	.....	73	.....	.....
Ammonia, free	.030	.....	.....	.012	.....	.02
Ammonia, albuminoid	.102	.....	.....	.084	.....	.108
Nitrites	.003	.....	.....	Tr.	.....	Tr.
Nitrates	0.30	.....	.....	0.30	.....	.3
Oxygen consumed	3.70	.....	.....	3.00	.....	5.1
Chlorine	4.38	.....	.....	5.50	.....	5.75
Hardness, total	48.6	.....	.....	47.1	.....	41.6
Alkalinity	22.0	.....	.....	22.0	.....	23.0
Bacteria per c.c.	1,000	750	350	80	600	450
B. coli type—10 c.c.	2+1—	0+3—	1+2—	0+3—	3+0—	2+1—
B. coli type—1 c.c.	0+3—	0+3—	0+3—	0+3—	2+1—	0+3—
B. coli type—1/10 c.c.	0+3—	0+3—	0+3—	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4 decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

LE ROY

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Le Roy, made by Mr. C. M. Baker, assistant engineer, on August 2, 1917.

Le Roy is an incorporated village of 4,084 inhabitants, located in the western part of Genesee county. The village is about 25 miles southwest of Rochester and is on the B. R. & P. R. R., the Erie R. R. and the Batavia branch of the N. Y. C. & H. R. R. R. Oatka creek flows through the village. No sewers are provided, the houses being served by privies, cesspools, etc. There are numerous manufacturing industries in the village.

An investigation was made of the public water supply of Le Roy in 1913, the report thereon being published on page 630 of the 34th Annual Report of this Department. The supply at that time was derived from wells located in and near the village. A new supply, however, has been developed and the old supply abandoned although connections still exist whereby it might be used as an auxiliary.

The present supply is derived from the upper part of Mud creek, the water being collected in an impounding reservoir at a point about 6 miles south of the village whence it flows by gravity through mechanical gravity filters to the village distribution system and to a standpipe located near the village. The purification plant is located just below the reservoir. About 75 per cent of the population of the village is served with the water, there being in all some 600 service taps, two-thirds of which are now metered. The remaining connections are being supplied with meters as rapidly as possible. The present consumption averages approximately 200,000 gallons daily, an equivalent of 65 gallons per capita. There are in all some 20 miles of water mains ranging in size from 4 to 16 inches in diameter. The pressure in the village is approximately 60 pounds per square inch. Storage is provided by means of the impounding reservoir which has a capacity of about 175,000,000 gallons, also at the village by means of the old standpipe with a capacity of 236,000 gallons and a new elevated steel tank with a capacity of 125,000 gallons.

The area of the watershed from which the supply is derived is about 1.7 square miles, there being a total of some 55 persons living thereon which is equivalent to about 32 persons per square mile. The watershed consists of gently sloping land which is used principally for farming and agricultural purposes. The storage reservoir covers a large area and is rather shallow. The village owns considerable land in the vicinity of the reservoir.

The buildings on the watershed are with one exception located well back from the stream and there appears to be little opportunity for direct pollution from them. At the farm of Clinton Phelps, about 1½ miles above the intake, however, the brook passes through the barnyard, the barn being about 30 feet distant. It seems practicable, however, with little expense, to divert the course of the stream around this barnyard and to provide a concrete wall between the yard and the stream and thus prevent direct pollution. A new house was being constructed near these premises at the time of the inspection and from it a tile drain was being laid to the creek. Whether this drain was to be used for sewage disposal or simply for sink wastes could not be definitely determined by the assistant engineer at the time of the inspection. For whatever purpose used, it would be a source of serious contamination to the supply.

Independent of the filters is a concrete sedimentation basin with a total capacity of 40,000 gallons, this capacity being sufficient for 4 or 5 hours' detention with the present rate of consumption. The basin is divided into two compartments, either or both of which may be put into service at any one time. The filters consist of two units of gravity mechanical filters, each 10½ by 18 feet in plan. The total filtering area is thus about .0174 acre which provides for a rate of filtration of approximately 115,000,000 gallons per acre per day. Thirty inches of sand underlaid by one foot of graded gravel constitutes the filtering medium. The strainer system consists of perforated " T " shaped tubes connecting with pipe laterals. The filters are provided with automatic rate controllers. The clear water well is located under the filters and has a capacity of 25,000 gallons.

Alum is applied to the water in amounts ranging from 10 to 150 pounds per day, the average being about 25 pounds per day. These figures correspond to 0.4, 5.3 and 0.8 grains per gallon respectively. The sedimentation basin is thoroughly cleaned four times yearly but the sludge valve is opened daily so as to flush out some of the sediment. The filters are cleaned when the loss of head reaches 5 feet, the periods between cleaning varying from 2 hours to 2 days depending upon the character of the raw water. Air agitation is provided for cleaning. The time required for washing ranges from 7 to 20 minutes, the rate of reversed filtration being 14 inches vertical rise per minute. After washing the first effluent is wasted for two or three minutes.

Samples of the water were collected at the time of the inspection, the results of the analyses of which together with others previously made by the Division of Laboratories and Research are recorded in the appended table.

The results of these analyses show a raw water at times somewhat high in color and turbidity, also a water that is very hard. The figures for nitrogen in its various forms are also at times somewhat high as are the figures for oxygen consumed and chlorine. The bacterial counts are comparatively high and colon bacilli are present in all the 10 c.c. inoculations, frequently in 1 c.c. and occasionally in 1/10 c.c. inoculations, thus indicating the presence of considerable active and potentially dangerous contamination in the raw water. Analyses of the treated water show at times rather high bacterial counts but the absence of colon bacilli. The high counts may be due in part to delay in transit since two days frequently elapse from the time the samples are collected until they are received at the laboratory.

As a result of this investigation it may be concluded:

1. That the present water supply of Le Roy is derived from a source which is subject to considerable direct and indirect pollution from farms located on the watershed and particularly from the farm of Clinton Phelps about 1½ miles above the intake.

2. That the purification plant appears to be of a satisfactory design and construction and that if properly operated it should satisfactorily remove the pollution from the water.

In view of the above I beg to offer the following recommendations to be acted upon by the village authorities:

1. That steps be taken to prevent, so far as possible, pollution of the supply from the premises of Clinton Phelps by diverting the course of the stream and by constructing a concrete wall to prevent direct drainage from the barnyard into the stream.

2. That should any trouble be experienced in maintaining proper sanitary conditions on the watershed, application be made to this Department for the enactment of rules and regulations for the protection of the sanitary quality of the supply.

In view of the prime importance of efficient operation of the purification plant it is suggested that the village follow out the plan which is now being quite generally adopted by the more progressive waterworks managements in the State of engaging the services of a consulting expert to make occasional visits to the plant during the year to study the local conditions and operation of the filters and to give detailed advice as to the best methods to employ to improve the operation of the plant and maintain it at its highest possible efficiency.

Finally, I would recommend that copies of this report be sent to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 21, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
LeRoy	Genesee	New reservoir near outlet*	1/13/16	2	50	1 v.	1 v.	257	66	191	.038	.270	.005	2.40	9.60	6.50	88.6	80.0	16,000	+	+	+
LeRoy	Genesee	New reservoir near center	1/13/16																12,000	+	++	++
LeRoy	Genesee	New reservoir, upper part	1/13/16																19,000	+	++	++
LeRoy	Genesee	Raw water	4/25/16	5	30	1 v.	1 v.	180	35	145	.120	.148	.010	1.60	6.00	5.50	87.10	84.0	1,000	+	+	−
LeRoy	Genesee	Effluent; congulation basin	4/25/16																1,700	+	−	−
LeRoy	Genesee	Tap in village	4/25/16																425	−	−	−
LeRoy	Genesee	Raw water	8/31/17	8	2	2 v.	2 v.				.146	.273	.003	0.02	7.00	5.75	151.4	156.0				
LeRoy	Genesee	Tap in village	8/31/17	4	Tr.	2 v.	2 v.				.006	.152	.002	0.06	4.80	5.12	145.8	138.0				
LeRoy	Genesee	Raw water	9/19/17																350	+	−	−
LeRoy	Genesee	Tap in village	9/19/17																200	−	−	−
LeRoy	Genesee	Raw water	5/ 1/17	0	160	2 a.	2 m.				.024	.178	Tr.	.12	4.00	5.25	114.2	97.0	2,000	2+1−	3+0−	1+2−
LeRoy	Genesee	Tap in village	5/ 1/17	0	Tr.	1 e.	2 e.				.012	.104	Tr.	Tr.	3.00	5.25	128.6	93.0	80	0+3−	0+3−	0+3−
LeRoy	Genesee	Raw water	8/ 2/17	25	20	1 v.	2 v.				.536	.292	.020	.16	5.80	5.50	142.8	133.0	200	1+2−	0+3−	0+3−
LeRoy	Genesee	Effluent from congulation basin	8/ 2/17																200	0+3−	0+3−	0+3−
																			400	0+3−	0+3−	0+3−
LeRoy	Genesee	Clear water well	8/ 2/17																500	0+3−	0+3−	0+3−
LeRoy	Genesee	Tap in village	8/ 2/17	0	0	0	0				.028	.262	0	0.70	4.3	5.50	151.4	128.0				

*Iron=2.25

LITTLE FALLS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the sanitary conditions of the public water supply of Little Falls made by Mr. C. M. Baker, assistant engineer, on November 28, 1916.

General information

Location.—Herkimer county, on N. Y. C. & H. R. R. R., 74 miles west of Albany.

Population.—13,002, all of which is served with the water.

Source of supply.—Regular, Beaver creek; auxiliary, Spruce creek.

Consumption.—3,500,000 or 4,000,000 gallons daily.

Distribution system.—Gravity. Twenty miles of mains 4 to 14 inches in diameter.

Service taps.—2,300 of which 1,475 are metered.

Pressure.—40 to 140 pounds per square inch.

Storage.—Beaver creek supply; impounding reservoir 1,000,000 gallons; Spruce creek supply; Klondike reservoir 700,000,000 gallons; Eaton reservoir 140,000,000 gallons. Distribution reservoir 25,000,000 gallons.

Purification.—Liquid chlorine sterilization, also slow sand.

Reference to previous investigations — Spruce creek supply.— Report of the State Dept. of Health.— Vol. 33, page 924. Reinvestigation December 15, 1915.

In the preceding report on a reinspection of this supply it was recommended that the city authorities install apparatus for sterilizing the supply with liquid chlorine and that they give careful attention to the desirability of subjecting the supply to treatment by a modern filtration plant in order to improve the physical and aesthetic qualities of this supply as well as its sanitary quality.

Subsequent to these recommendations the city has installed and is now operating a plant for sterilizing the water with liquid chlorine. Although no active step has been taken to provide filtration for the whole supply the slow sand filter operated in connection with the Spruce creek supply has been thoroughly overhauled and put in a more satisfactory condition.

The liquid chlorine plant consists of a Wallace & Tiernan, type "B", manual control apparatus which is provided with an automatic shift for disconnecting one cylinder when it becomes empty and cutting in another. It was installed in September, 1916. Scales are provided for determining the amount of chlorine actually used and thus checking the operation of the apparatus. Careful and complete records are kept of the operation of the plant. Chlorine is applied at a rate of 8 to 10 pounds per day when the Beaver creek supply only is being used and 10 to 12 pounds per day when the Spruce creek supply is in use. This is equivalent to .25 to .35 part per million of chlorine. The plant is located just above the distribution reservoir and applies the gas to the water of the inlet to this reservoir.

The slow sand filter for the Spruce creek supply, as now constructed, is about three-fourths of an acre in area. The depth of the sand at the upper end is about 24 inches and at the lower end 32 inches, while the depth of the water over the filter sand is approximately 2 feet and 3 feet 4 inches respectively. Below the sand is gravel which covers the collecting tile. With the present consumption the rate of filtration does not exceed 2,000,000 gallons per acre per day. In view of the fact that water is used from this source only a short time during the summer it is necessary to clean the filter only once each year just before being put into operation.

The sanitary conditions on the watershed are substantially the same as at the time of previous investigations and as recorded in previous reports. The most serious source of pollution seems to be in connection with the Spruce creek supply due to summer cottages along the shore of Eaton

reservoir from which this supply is directly obtained. At this place there are about 25 cottages directly on the shores of the reservoir. No bathing is allowed in the lake, however, and the rules and regulations enacted by this Department for the sanitary protection of the supply are rigidly enforced by an inspector of the city who resides upon the watershed.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses since the previous report are recorded in the appended table.

Analyses of the water prior to the installation of the apparatus for sterilizing the supply with liquid chlorine have frequently shown the presence of contamination as indicated by high bacterial counts and the presence of colon bacilli. The first series of analyses recorded in the appended table clearly show this condition, colon bacilli being present in dilutions as small as 1/10 c.c. At that time, although the chlorine plant was installed, it was out of operation for repairs. The results of the analyses of the samples collected at the time of this inspection, however, show a substantial reduction in the number of bacteria and also practically the elimination of colon bacilli.

As a result of this investigation it may be concluded:

1. That the recommendations of this Department embodied in previous reports have been partially carried out in that apparatus has been installed for sterilizing the supply with liquid chlorine and, although no steps have yet been taken to provide filtration of the whole supply, the Spruce creek filter has been overhauled and put in better condition.
2. That the supply is still subject to some pollution from inhabitants on the watershed.
3. That the water from the Spruce creek supply is highly colored and at times the water drawn from the mains in the city is somewhat turbid.

In view of the above I beg to recommend as in the previous report that the city authorities consider the desirability of providing filtration for the whole supply in order to improve its physical, aesthetic and sanitary qualities.

The installation and operation of a filter at the distribution reservoir would eliminate the necessity of maintaining the filter in connection with the Spruce creek supply. Furthermore, a mechanical filter with alum used as a coagulant would remove considerable of the color that is present in the water of this supply and it would also, if properly operated, remove all turbidity.

There has been some agitation in the city regarding the purchase of considerable land upon the watershed tributary to the Beaver creek supply. While this may be desirable it would seem that the installation and efficient operation of the filtration plant would secure a much greater improvement of the supply since, even with the purchase of a portion of the watershed, it would be impossible to eliminate all sources of pollution. Furthermore, filtration would have the additional advantage of improving the physical qualities of the water.

In conclusion I would recommend that copies of this report be sent to the village officials and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *February* 8, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Little Falls	Herkimer	Spruce creek, Klondike reservoir	9/22/16																15	−	−	−
Little Falls	Herkimer	Spruce creek, Eaton pond	9/22/16																275	+	+	+
Little Falls	Herkimer	Mixed-inlet to distribution reservoir	9/22/16																325	+	+	+
Little Falls	Herkimer	Tap in city	9/22/16																*240	+	+	+
Little Falls	Herkimer	Spruce creek, Eaton pond	11/28/16	35	Tr.	2 v.	2 v.	62	20	42	.006	.128	.001	0.50	9.40	0.38	37.7	9.0	250	3+0−	1+2−	1+2−
Little Falls	Herkimer	Beaver supply, King spring	11/28/16	Tr.	Cl.	1 v.	1 v.	118	16	102	.002	.004	.001	0.50	1.50	0.50	102.8	94.0	15	1+2−	0+3−	0+3−
Little Falls	Herkimer	Beaver supply, storage reservoir	11/28/16																Liquefied	3+0−	1+2−	0+3−
Little Falls	Herkimer	Beaver supply, inlet district reservoir	11/28/16																Liquefied	2+1−	0+2−	0+3−
TREATED WATER																						
Little Falls	Herkimer	Beaver supply, tap in city	11/14/16	5	3	1 v.	1 v.	150	19	131	.006	.023	.005	0.16	1.20	0.63	111.4	101.0	5	1+2−	0+3−	0+3−

* Chlorine plant installed, but not operating; out of order.

LOCKPORT

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the sanitary condition of the public water supply of Lockport made by Mr. C. M. Baker, assistant engineer, on April 2, 1917.

General information

Location.— Niagara county, on the New York Central railroad, about 25 miles northeast of Buffalo.

Population.— 18,693.

Source of supply.— Niagara river.

Consumption.— 6,529,000 gallons, or 349 gallons per capita.

Distribution system.— The water is pumped from the river through the distribution system, consisting of 37 miles of 4-inch to 24-inch mains, into the standpipe.

Service taps.— 4,400; of which 2,700 are metered.

Pressure.— 70 to 75 pounds per square inch.

Storage.— Standpipe 500,000 gallons.

Purification.— Sterilization with liquid chlorine.

Reference to previous investigations.— A report on a complete investigation of this supply may be found on page 907 of the 32d Annual Report of this Department in addition to which a report on a reinspection was made under date of November 30, 1915, and one on an investigation of the chlorine plant under date of August 1, 1916.

Previous reports have pointed out the contaminated condition of the raw water and the necessity of proper purification at all times in order to render the water safe for domestic purposes. At the time of the previous inspection of the chlorine plant, however, it was found that an insufficient amount of chlorine (.12 part per million) was being applied to assure adequate purification at all times. In view of these conditions the following recommendations were then made.

1. That regarding the operation of the chlorine apparatus:
   (a) Scales be provided to determine the loss of weight in the chlorine cylinder or the amount of chlorine actually applied.
   (b) Careful supervision of the plant be provided at all times and any difficulties in connection with its operation immediately corrected.
   (c) Complete records be kept of the operation of the plant showing the date of connecting each chlorine cylinder, daily readings of the chlorine flow meter and of the weighing scales, also of any difficulties encountered or other information of interest in connection with the operation of the plant.
2. That unless a complete purification plant is provided a duplicate apparatus be installed for treating the water supply with liquid chlorine in order that there may be no interruption in this treatment when it becomes necessary to repair the apparatus.

Since the previous investigation of the chlorine plant the old apparatus has been removed and a new one similar in type and constructed by the same company has been installed. Scales have been provided for checking the operation of the apparatus, but these were not in use at the time of this inspection.

Since previous reports have emphasized the polluted and contaminated condition of the raw water as taken from the Niagara river it is unnecessary to discuss this matter at this time. It is significant, however, that just after the preceding investigation the chlorine plant was out of operation for several hours and that within two weeks after this time some 14 or 15 cases of typhoid fever had developed in the city. This matter, however, was also pointed out and discussed in detail in the previous report.

As stated above, although scales are provided they were not being used at the time of this inspection. The chief engineer of the plant was ill at the time and the assistant then in charge stated that he did not know why the scales were not used. Apparently the assistant engineer had received very little instruction regarding the operation and care of the chlorine apparatus. In view of the necessity of careful and continuous operation of the apparatus, it is essential that there be proper co-operation between the chief engineer and his assistants and that the assistants be thoroughly informed regarding the methods of operation of the chlorine apparatus. Records were kept of the scale readings for a time after the scales were provided but this practice had been abandoned some time prior to the inspection. Records are kept, however, of the time at which new cylinders of chlorine are connected with the apparatus. According to these records two cylinders of chlorine were connected on January 7, two on February 9 and two on March 10, it being thus apparent that four cylinders or 400 pounds of liquid chlorine lasted 62 days. During this period the average water consumption was 6,529,000 gallons per day. With this rate of consumption the rate of applying the chlorine was equivalent to only about .12 part per million which checks fairly well with the rate indicated by the chlorine meter at the time of the inspection, viz., 5 ounces per hour or .14 part per million. It is thus apparent that the amount of chlorine now being applied is about the same at the time of the previous inspection when it was pointed out that an insufficient amount was being used to at all times secure satisfactory disinfection of the water. While under certain favorable conditions fairly satisfactory results may be obtained with this amount of chlorine the margin af safety is too small and under unfavorable conditions proper disinfection of the water would not be secured.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

Samples of the raw water could not be obtained at the time of the inspection and the results, therefore, do not show the relative efficiency of sterilization but, since the bacterial count was low and colon bacilli absent, it is apparent that satisfactory purification was being obtained. As pointed out above, however, it is quite probable that under certain conditions the amount of chlorine being used would not secure adequate purification.

A matter which might well be given consideration at this time is the lack of adequate storage at the city. The city is supplied with water from the Niagara river through a single force main 14 miles in length. In case of a break in this main the only water available is that in the standpipe which, when full, contains only about 2 hours' supply. In May, 1914, a break occurred in this main which required 72 hours to repair and during this period the city was practically without water. In the fall of 1916 it was necessary to make a change in the main and this time, although previous arrangements had been made, 30 hours were required to make the change. During this latter period, however, provision was made for water by warning the citizens to store it in bathtubs and other utensils while fire protection was provided to some extent by laying fire hose and having fire engines ready to pump water from the canal. It is obvious from the above that, in case of a large fire at a time when the force main is out of service serious property damage would result, furthermore serious insanitary conditions may result from the lack of water and an epidemic of typhoid fever might result from the use of impure water. Three methods of obviating these unsatisfactory conditions may be suggested, namely, a second force main, an auxiliary supply of a satisfactory quality or the providing of more adequate storage near the city.

As a result of this investigation it may be concluded:

1. That regarding purification of the water the city of Lockport has not taken the necessary steps to fully carry out the recommendations embodied in the previous report. Although scales have been provided for checking the apparatus, they were not being used nor were complete records of operation being kept. Furthermore chlorine was not being

applied in a sufficient amount to secure adequate purification under all conditions.

2. That at times the city is without water because of necessary repairs in the single force main from the pumping plant and the absence of reserve storage.

In view of the above, I beg to offer the following recommendations to be acted upon by the city authorities as soon as possible:

1. That the recommendations of the previous report be completely carried out.

2. That provision be made for furnishing water in case of a break in the force main, either by constructing a second main, providing an auxiliary supply of satisfactory sanitary quality or by providing adequate storage near the city.

In view of the experience that the city of Lockport has had with typhoid fever in the past and in view of the fact that about a year ago there were a number of cases of this disease in the city due apparently to inefficient or ineffective operation of the chlorine plant, it is evident that the proper officials should give this matter their most careful consideration and take the necessary steps to protect the health of the inhabitants of the city by the careful and efficient purification of the water supply at all times.

Finally, I would recommend that copies of this report be sent to the board of water commissioners, to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 8, 1917

REPORT OF WATER ANALYSES FOR LOCKPORT.

Source	Tap at pump station	Tap in city
Collected on	.....	.....
Color	.....	.....
Odor, hot	.....	.....
Odor, cold	.....	.....
Turbidity	.....	.....
Solids, total	.....	.....
Loss on ignition	.....	.....
Mineral residue	.....	.....
Ammonia, free	.....	.....
Ammonia, albuminoid	.....	.....
Nitrites	.....	.....
Nitrates	.....	.....
Oxygen consumed	.....	.....
Chlorine	.....	.....
Hardness, total	.....	.....
Alkalinity	.....	.....
Bacteria per c.c	20	10
B. coli type 10 c.c.	0+3—	0+3—
B. coli type 1 c.c.	0+3—	0+3—
B. coli type 1/10 c.c.	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

LOOMIS SANATORIUM

HARRY L. SHIVELY, M.D., *Physician in Chief, Loomis Sanatorium:*

As a result of our inspection of your water supply in connection with our investigation of the recent epidemic of gastroenteritis at the Loomis Sanatorium we feel that certain suggestions should be made to you regarding improvements in the water supply. Although the results of the investigation did not point to the water supply as the source of trouble the supply is not above suspicion and certain improvements should, therefore, be made.

1. The cover or roof of the infiltration gallery or spring from which the supply is derived was broken in a number of places and in need of repair.

2. The infiltration gallery is located very close to a small brook, about 10 feet, which flows through the grounds and although the sanitary conditions in the vicinity of the brook appeared to be fairly satisfactory under certain conditions contamination might find its way into the stream and by filtration through the soil might cause pollution of the water in the infiltration gallery. Furthermore there is considerable seepage from the side of the hill above the infiltration gallery from the direction of the cottage known as Olivia cottage. This seepage issues from the bank near the foot of a natural drain or depression leading up the slope and terminating at the road near Olivia cottage. The sewage from this cottage is disposed of in a small disposal plant separate from the main disposal and located several hundred feet below the water supply. The sewer from the building, however, passes near the head of the natural drain or depression mentioned above; the nearest point from the sewer line to the infiltration gallery, however, is about 400 feet. Although the distance is considerable the soil at this place appears to be underlaid by a shale rock which might result under certain hydrostatic conditions in a rather rapid flow of ground water from near the sewer to the infiltration gallery and thus cause pollution of the water supply. Whether pollution finds it way into the infiltration gallery by seepage from the brook or from the sewers of Olivia cottage can be definitely determined only by an extensive series of analyses of the water supply. A small test spring could be developed on the hillside just above the infiltration gallery intercepting the flow of ground water from toward Olivia cottage. Frequent analyses of water from this spring particularly at times of heavy rainfall would indicate whether this water is polluted and regular and frequent analyses of the regular supply would indicate whether pollution finds its way into the infiltration gallery from the nearby brook. You doubtless could arrange to make these analyses at your institution laboratory.

3. Although the reservoir appears to be well protected by fences against trespassers no such protection is afforded by the spring or infiltration gallery, and there is possibly some danger of pollution from this source. It would seem, therefore, that a sufficient area should be enclosed by suitable fences about the spring and that notices should be posted prohibiting trespassing in the vicinity.

4. There was a very heavy growth of green algae in the reservoir at the time of the inspection. A microscopic examination of the water showed the presence of numerous small organisms resembling the larvae of small insects, also the presence of a class of green algae growth, Chlorophyceae, probably of the form Scenedesmus. This latter organism is the cause of the green color of the water which existed at the time of the inspection. The growth of algae could be prevented by covering the reservoir or by treatment of the water with copper sulphate.

The results of analyses of samples collected at the time of the inspection are recorded in the enclosed table. The analyses of the water from the infiltration gallery show a rather high bacterial count with organisms of the B. coli type present in two of the three 10 c.c. inoculations thus indicating

the presence of some active contamination. The samples collected from the reservoir and a tap at the institution, however, show the presence of a moderate number of bacteria and the absence of colon bacilli. The chemical analyses of the sample collected from the tap at the institution show some turbidity, probably due to the algae growth.

The figures for nitrites and chlorine are high thus indicating that pollution is finding its way into the ground water tributary to the supply. The analysis of the sample collected from the brook indicates a high bacterial count with colon bacilli present in all of the 10 and 1 c.c. inoculations and in two of the three 1/10 c.c. inoculations thus indicating the presence of considerable active and potentially dangerous contamination. As pointed out above it seems quite possible that under certain conditions pollution from this source may find its way into the infiltration gallery.

In view of the above it seems advisable to recommend as follows:

1. That repairs be made to the roof or cover of the infiltration gallery.
2. (a) That analyses be made of the regular supply at frequent intervals particularly during periods of heavy rainfall.
   (b) That a test spring or intake be developed in the hillside just above the infiltration gallery and that frequent analyses be made of this source particularly during periods of heavy rainfall to determine whether this water receives pollution from the sewers from Olivia cottage.
3. That adequate area be enclosed about the infiltration gallery to protect the supply from pollution and furthermore that notices be posted prohibiting trespassing in the vicinity.
4. That the growth of algae be prevented in the reservoir either by the construction of a roof over it or by treatment of the water with copper sulphate under the direction of someone familiar with the use of this chemical for this purpose.

If, as a result of the analyses recommended in No. 2, it is found that pollution finds it way into the supply either from the brook or from the sewers of Olivia cottage, steps should be immediately taken to procure a new supply of a satisfactory quality.

Trusting that this advice will be of service to you and assuring you of our cooperation, I am

Yours very truly,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 20, 1917

REPORT OF WATER ANALYSIS FOR LIBERTY

SOURCE	LOOMIS SANATORIUM			
	Brook near infiltration galley "B"	Storage reservoir "C"	Tap main building "D"	Infiltration gallery "A"
Collected on	8/28/17	8/28/17	8/28/17	8/28/17
Color			0	
Odor, hot			1 v.	
Odor, cold			1 v.	
Turbidity			10	
Solids, total				
Loss on ignition				
Mineral residue				
Ammonia, free			.006	
Ammonia, albuminoid			.224	
Nitrites			Tr.	
Nitrates			.7	
Oxygen consumed			1.7	
Chlorine			3.25	
Hardness, total			36.4	
Alkalinity			27.0	
Bacteria per c.c.	750	200	250	950
B. coli type 10 c.c.	3+0—	0+3—	0+3—	2+1—
B. coli type 1 c.c.	3+0—	0+3—	0+3—	0+3—
B. coli type 1/10 c.c.	2+1—	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

LYONS FALLS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the municipal water supply of Lyons Falls, made by Mr. C. M. Baker, assistant engineer, on October 25, 1916.

Lyons Falls is an incorporated village of 863 inhabitants, according to the 1915 census, located in Lewis county, on the Utica and Ogdensburg branch of the New York Central railroad, 45 miles north of Utica. The village is at the junction of the Moose river with the Black river. No public sewer system is provided in the village, although there are some private sewers, which discharge without treatment into the river, with one of which there are about 30 house connections.

There are two public water supplies in the village, one owned by the Beauty Spring Water Company, the other being the municipal supply, and the one under consideration in this report. The supply is derived from a small spring brook called Beauty creek, at a point 2 or 2½ miles southwest of the village, and was first put into operation in 1909. Seventy-five or eighty per cent of the population is served with the water, there being in all about 100 service taps, none of which are metered. Due to the lack of meters or other method of measuring the water used no definite information could be obtained regarding the consumption, but based upon a per capita rate of 100 gallons daily the total consumption would be about 63,000 gallons per day. There are 3 or 3½ miles of water mains, ranging in size from 4 inches to 10 inches in diameter. The pressure in the main part of the village is approximately 80 pounds per square inch.

An earthen dam with a concrete core wall has been constructed across the

stream forming an impounding reservoir, having a capacity of about 1,000,000 gallons, an equivalent of about 16 days' consumption. The upper side of the dam is rip-rapped with flag stones. From this reservoir the water flows by gravity to the village.

The watershed tributary to the supply is approximately .4 square mile in area. Most of this area has fairly steep slopes. About 25 per cent of it is wooded, the remaining area being used largely for pasture land. The village owns some 30 acres in the immediate vicinity of the reservoir, which is fenced. Above the land owned by the village, however, the watershed is used for pasturing, live stock having free access to the streams. There has been some agitation in the village to purchase this area in order to eliminate this source of pollution. One family lives on the watershed, but the buildings are well back from the stream, and there appears to be little opportunity for direct pollution from this source. No application has been made to this Department for the enactment of rules and regulations for the sanitary protection of the supply.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water at times rather highly colored but satisfactory in respect to turbidity and low in hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low, those for nitrates and chlorine, however, are at times rather high, thus indicating the presence of pollution. The bacterial counts are at times very high and colon bacilli are prevalent in the 10 c.c. inoculations, frequently present in the 1 c.c, and occasionally present in 1/10 c.c. inoculations, thus indicating the presence of active and potentially dangerous contamination.

As a result of this investigation it may be concluded that the municipal water supply of Lyons Falls is subject to pollution from the following sources:

(a) Indirectly from trespassers on the watershed and also from the one family living thereon.

(b) Directly from surface drainage from pasture land.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That the village give careful consideration to the purchasing of the land on the watershed in the immediate vicinity of the streams tributary to the supply; or

2. That, should it seem impracticable to purchase this land, apparatus be provided and the supply treated with liquid chlorine or otherwise satisfactorily purified.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *January* 18, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°-48 hours,	10 c.c.	1 c.c.	1-10 c.c.
Lyons Falls	Lewis	Tap, municipal supply	3/15/11	5	Cl.			46		20	.028	.068	Tr.	0.80	1.30	1.00	14.3	13.0	160	—	—	—
Lyons Falls	Lewis	Tap, municipal supply	6/ 2/11	40	5			48		20	.016	.068	.001	0.20	5.90	1.75	12.7	10.0	600	+	+	+
Lyons Falls	Lewis	Tap, municipal supply	10/11/11	5	Cl.			34		26	.005	.026	.001	0.60	1.80	0.50	20.8	13.0	70	+	—	—
Lyons Falls	Lewis	Tap, municipal supply	12/28/11	5	Cl.			37		23	.044	.060	.001	0.50	1.50	0.62	20.8	14.0	200	+	—	—
Lyons Falls	Lewis	Tap, municipal supply	2/14/12	3	Cl.			44		24	.020	.026	Tr.	0.72	0.80	0.75	12.7	11.0	20	—	—	—
Lyons Falls	Lewis	Tap, municipal supply	3/19/12	20	Tr.			47		26	.014	.032	Tr.	0.68	1.98	0.25	22.1	11.0	850	+	+	—
Lyons Falls	Lewis	Tap, municipal supply	4/22/12	20	Cl.			36		24	.010	.036	.001	0.48	2.00	0.50	16.9	11.0	550	+	—	—
Lyons Falls	Lewis	Tap, municipal supply	9/20/12	10	Cl.			54		40	.003	.016	Tr.	0.60	1.50	0.37	18.2	12.0	550	+	+	—
Lyons Falls	Lewis	Tap, municipal supply	10/28/12	35	2			54		32	.006	.030	Tr.	0.60	4.30	0.25	20.8	11.0	1,200	+	+	—
Lyons Falls	Lewis	Tap, municipal supply	12/ 9/12	25	Tr.			52		31	.010	.068	Tr.	0.50	3.40	0.50	16.9	12.0	500	—	—	—
Lyons Falls	Lewis	Tap, municipal supply	1/15/13	10	Tr.			48			.014	.042	.001	0.70	2.10	0.75	19.5	11.0	1,400	—	—	—
Lyons Falls	Lewis	Tap, municipal supply	2/17/13	5	Cl.			46			.018	.050	Tr.	0.70	1.20	0.75	18.2	11.0	50	—	—	—
Lyons Falls	Lewis	Tap, municipal supply	3/31/13	25	Tr.			30			.010	.038	Tr.	0.60	2.30	1.12	20.8	7.0	200	+	—	—
Lyons Falls	Lewis	Tap, municipal supply	5/12/13	2	Cl.			39			.004	.038	Tr.	0.40	1.10	0.50	14.3	12.0	30	+	—	—
Lyons Falls	Lewis	Tap, municipal supply	6/23/13	Tr.	Cl.			42			.006	.018	.001	0.50	1.70	0.25	15.6	13.0	.....	+	+	—
Lyons Falls	Lewis	Tap, municipal supply	7/23/13	5	Tr.			41			.008	026	Tr.	0.30	1.40	0.50	15.6	15.0	.....	+	+	—
Lyons Falls	Lewis	Tap, municipal supply	10/25/16	Tr.	Tr.			.....			.038	.032	Tr.	0.64	2.10	0.50	22.1	12.0	270	3+0—	1+2—	0+3—

LYONS FALLS

LINSLY R. WILLIAMS, M. D., *Acting State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of the Beauty Spring Water Company, furnished to a portion of the village of Lyons Falls. This investigation was made by Mr. C. M. Baker, assistant engineer, on October 25, 1916.

Lyons Falls is an incorporated village of 863 inhabitants, located on the Utica and Ogdensburg branch of the New York Central railroad, about 45 miles north of Utica. Water is also supplied to the inhabitants by a municipal supply. Sewerage is provided by two or three private sewers that discharge without treatment into the Black river.

This supply is derived from a spring located about 2½ miles southeast of the village. From this spring the water flows by gravity through the natural course of a small brook for a distance of about 1,000 feet to a small dam which diverts the water into an intake basin from which it flows by gravity to the village. Twenty-five or thirty per cent of the population are served with the water, there being in all 96 service taps, none of which are metered. The mains consist of 2½ miles of pipe ranging in size from 2½ to 4 inches in diameter. The pressure in the village ranges from 25 to 45 pounds per square inch. This supply, however, is not depended upon for fire protection. No definite information could be obtained regarding the consumption, but based upon a per capita rate of 100 gallons daily, the total consumption would be approximately 2,200 gallons per day.

The intake consists of the small diverting dam mentioned above, and a covered intake basin which is constructed of wood. It is protected by a half-inch mesh screen provided at the inlet of the basin. The supply is subject to surface wash from a tributary watershed of possibly 25 or 30 acres. This area is practically all wooded and there are no permanent sources of pollution. The spring is not protected by a fence or other structure and is about 200 feet from a road. A path leading from the road to the spring indicates that the spring is frequented by hunters and trespassers in the vicinity.

Although, due to the lack of containers, samples of water were not collected at the time of the inspection, they were later collected by Dr. Daniel D. Parrish, health officer, and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water that is satisfactory with respect to color and turbidity, and one that is only moderately hard. The figures for nitrogen in the form of free ammonia, albuminoid ammonia and nitrites are low, those for nitrates and chlorine, however, appear to be slightly above normal. The bacterial counts are at times high, and colon bacilli are frequently present in 10 c.c. inoculations, and occasionally in 1 c.c. inoculations, thus indicating the presence of active contamination either of animal or human origin.

As a result of this investigation it may be concluded that the water supply of the Beauty Spring Water Company is subject to pollution from the following sources:

(a) To some extent from trespassers on the watershed.
(b) From surface wash which finds its way into the supply.

In view of the above, I beg to offer the following recommendations to be acted upon by the water company:

1. That a sufficient area be enclosed by a substantially constructed fence about the springs, and that drainage ditches be constructed within this area to divert all surface wash.
2. That the intake be extended to the spring or to within the enclosed area, in order to prevent surface wash from entering the supply.

I would recommend further that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 17, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Lyons Falls	Lewis	Tap, Beauty spring supply	3/15/11	Tr.	Tr.	....	....	67	....	48	.010	.034	Tr.	0.50	0.50	0.75	45.7	43.0	50	+	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	6/ 2/11	5	2	....	....	65	....	53	.003	.020	.001	0.20	1.40	1.00	40.3	40.0	240	+	+	−
Lyons Falls	Lewis	Tap, Beauty spring supply	10/11/11	Tr.	Cl.	....	....	62	....	57	.002	.026	.001	0.30	0.30	0.75	47.1	43.0	50	+	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	12/28/11	Tr.	Cl.	....	....	63	....	48	.018	.030	.001	0.40	0.90	0.62	46.3	40.0	80	+	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	2/14/12	3	Cl.	....	....	68	....	55	.024	.038	Tr.	0.40	0.34	0.75	41.6	41.0	30	+	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	3/19/12	Tr.	Cl.	....	....	73	....	58	.020	.030	Tr.	0.44	0.70	0.50	48.6	40.0	110	+	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	4/22/12	Tr.	Cl.	....	....	64	....	55	.005	.020	.001	0.26	0 70	1.00	40.3	40.0	250	+	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	9/10/12	5	Cl.	....	....	76	....	70	.002	.008	Tr.	0.32	1.00	0.50	52.9	44.0	140	−	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	10/28/12	Tr.	Cl.	....	....	72	....	60	.008	.038	.001	0.30	1.60	0.25	47.1	41.0	2,300	−	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	12/ 9/12	5	Cl.	....	....	67	....	53	.010	.026	.001	0.34	1.60	0.50	44.3	40.0	275	−	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	1/15/13	5	Cl.	....	....	83	....	....	.003	.034	Tr.	0.34	1.60	0.50	45.7	41.0	100	−	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	2/17/13	5	Cl.	....	....	64	....	....	.012	.022	Tr.	0.40	1.10	0.75	50.0	44.0	90	−	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	6/23/13	Tr.	Cl.	....	....	82	....	....	.001	.028	.001	0.16	0.20	0.12	48.6	46.0	.....	+	−	−
Lyons Falls	Lewis	Tap, Beauty spring supply	7/28/13	Tr.	Tr.	....	....	83	....	....	.006	.018	Tr.	0.24	0.70	0.50	44.3	38.0	.....	+	+	−
Lyons Falls	Lewis	Tap, Beauty spring supply	2/ 7/17	Tr.	Cl.	....	....	....	....	....	.014	.036	.002	0.18	0.40	0.50	36.4	42.0	20	0+3−	0+3−	0+3−

MACHIAS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Machias, made by Mr. C. M. Baker, assistant engineer, on September 6, 1917.

Machias is an unincorporated village of about 600 inhabitants, located in the northern part of Cattaraugus county, at the junction of the B. R. & P. R. R. with the Olean-Buffalo division of the Pennsylvania railroad, about 45 miles southeast of Buffalo. It is in the valley of Ischua creek. No sewer system is provided, the houses being served by privies, cesspools, etc.

The supply is owned and operated by the Machias Water Supply Company, of which Mr. H. B. Maxson is president, and Mr. M. W. Prescott, superintendent. The supply is obtained from springs, located about 3 miles west of the village, from which water flows by gravity to the distribution system, the excess going to a storage reservoir. The supply was first installed and put into operation about 1910, and since then the only improvements have consisted of extensions to the distribution system, the excess going to a storage reservoir.

There are in all about 5 miles of water mains ranging in size from 4 inches to 8 inches in diameter. About 75 per cent of the population of the village is served with the water, there being in all some 100 service taps, only 2 or 3 of which are metered. The pressure in the village is about 48 pounds per square inch. Due to lack of meters or other method of measuring the water, no definite information could be obtained regarding the consumption.

For 4 years after the installation of the supply the village paid the water company for the use of hydrants for fire protection, but during this period the village had no fire hose. About 1915, however, fire hose was purchased, but the next year the village voted to discontinue payment to the water company for the use of the hydrants. The village, therefore, has now no right to the use of the water for fire protection, although the hydrants are still in place and connected with the supply. The storage reservoir, however, is not at all times kept filled, it having been empty practically all of the past summer, but was filled shortly before the time of the inspection to supply water for State road construction in the vicinity.

The reservoir is located on a hill, about half a mile west of the village. It is constructed of masonry and covered with a wooden house. It is 20 by 40 feet in plan and is 7 feet deep, thus having a capacity of about 420,000 gallons.

The springs from which the supply is obtained are located in pasture land, about 3 miles west of the village. They consist of two lines of collecting tile, which collect the water and discharge into a receiving basin, whence the water flows by gravity to the village distributing system. An area about 150 feet square is owned by the water company and enclosed by a fence about the springs. No drainage ditches are provided to divert surface wash from above. This area is wooded, however, and is probably not frequented by cattle. There are no permanent sources of pollution in the vicinity.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity, but a water somewhat high in hardness. The figures for nitrogen in its various forms are low, but those for chlorine appear to be at times somewhat above normal. The bacterial counts are at times high which, however, may be due in part to delays in transit, 4 days having elapsed from the time the samples were collected until they were received at the laboratory. Colon bacilli were occasionally found present in samples collected in 1912, but since that time the supply seems to have been practically free from organisms of this type.

As a result of this investigation, it may be concluded that the public water supply of Machias is obtained from springs which, if at all times properly protected from pollution, should furnish a satisfactory supply of water. There appears to be, however, some possibility of pollution by surface wash, due to the lack of suitable drainage ditches.

In view of the above, I beg to recommend that the water company construct suitable drainage ditches within the area enclosed about the springs to divert the surface wash from above.

Finally, I would recommend that copies of this report be sent to the water company, to the local health officer, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 18, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Machias	Cattaraugus	Tap, public supply	2/26/12	Tr.	Cl.	....	....	122	....	102	.006	.008	Tr.	0.50	0.30	0.50	78.6	78.0	1,200	+	+	−
Machias	Cattaraugus	Tap, public supply	4/12/12	Tr.	Cl.	....	....	95	....	75	.010	.016	.001	0.48	0.30	0.75	67.1	65.0	20	+	−	−
Machias	Cattaraugus	Tap, public supply	9/25/12	Tr.	Cl.	....	....	130	....	101	.002	.006	.001	0.48	0.30	1.00	88.6	82.0	130	−	−	−
Machias	Cattaraugus	Tap, public supply	11/14/12	Tr.	Cl.	....	....	103	....	93	.004	.034	.001	0.54	0.50	1.00	71.4	70.0	240	+	−	−
Machias	Cattaraugus	Tap, public supply	12/17/12	Tr.	Cl.	....	....	99	....	81	.024	.006	Tr.	0.50	0.25	0.50	80.0	79.0	400	−	−	−
Machias	Cattaraugus	Tap, public supply	1/25/13	Tr.	Cl.	....	....	95	....	....	.008	.024	Tr.	0.60	0.30	1.00	71.4	71.0	5	−	−	−
Machias	Cattaraugus	Tap, public supply	4/ 9/13	Tr.	Cl.	....	....	106	....	....	.016	.004	Tr.	0.50	0.30	0.75	78.6	77.0	5	−	−	−
Machias	Cattaraugus	Tap, public supply	7/15/13	Tr.	Cl.	....	....	118	....	....	.004	.006	.001	0.20	0.20	0.75	91.4	89.0	.....	−	−	−
Machias	Cattaraugus	*South, inlet to receiving basin	9/ 6/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2,300	0+3−	0+3−	0+3−
Machias	Cattaraugus	*North, inlet to receiving basin	9/ 6/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3,750	1+2−	0+3−	0+3−

* Samples four days in transit.

MALONE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the public water supply of the village of Malone, Franklin county. An investigation of this supply was made on May 2, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. A. H. Wilding, health officer, and Mr. G. A. Wilson, superintendent of the works.

Malone is an incorporated village in the northern part of Franklin county and is on the New York Central and Hudson River railroad, the Rutland railroad and Salmon river. The population at the time of the inspection was estimated to be 7,540. Private sewers serve about 80 per cent of the population and discharge into the Salmon river.

The water supply is owned by the municipality and the waterworks were designed by Professor Green of Troy and constructed by contract under his direction in 1888. The works were originally owned by a private water company and the village took over the supply on October 1, 1906.

The water supply is obtained from Horse and Lightning brooks which are about 8 miles south of the village and an auxiliary supply is obtained from Roaring brook which is a short distance north of the other brooks. The water from the brooks first passes through an intake chamber and thence to a reservoir located on a hill about 1½ miles southeast of the village. A booster pump is located on the main line a short distance southwest of the reservoir and is used at such times as the consumption is greater than the capacity of the pipe line.

Practically all of the population is served by this water supply; the average daily consumption being 1,200,000 gallons and with the booster pump in operation the consumption is raised to 1,400,000 gallons per day. These figures on consumption were obtained from the report of a Pitometer survey made in July, 1916. There are about 35¼ miles of water mains varying from 4 to 12 inches in diameter. There are about 1,600 houses in the village and about 1,700 consumers. None of the supplies are metered. The average pressure in the village is about 80 pounds per square inch and fire protection is provided by 103 hydrants placed in various parts of the village.

Water from Horse and Lightning brooks is brought together through a by-pass and thence enters the main intake chamber. This intake chamber is about 20 by 28 feet in plan and is divided into two compartments, the water passing into one chamber and the surplus water passing out again into the brook while the village supply passes through a screen to a second chamber and thence to the pipe line leading to the reservoir. The brook near the intake chamber is usually cleaned out three or four times a year and at such times the auxiliary supply from Roaring brook is used. At these times the water is conveyed to the intake chamber through a pipe line and the water from this source is used only for about a day at a time.

The booster pump station is a frame building about 12 by 20 feet in plan and contains a Morris Machine Works 6-inch rotary pump driven by a Westinghouse 20-horse-power electric motor. This pump is operated only at such times as the consumption is greater than the pipe line will carry under the normal gravity head.

The reservoir is about 150 feet square and 11 feet deep. It is open and has concrete sides and bottom. The reservoir has a capacity of 1,500,000 gallons which is a little greater than the average daily consumption. The water usually enters through a series of aerating pipes at one side and passes through the outlet at the other side of the reservoir. The reservoir may be by-passed and the distribution system fed directly from the intake. The reservoir is usually cleaned once a year and the street mains are flushed frequently during the warm weather, principally by the use of water drawn for street sprinkling.

The regular supply has a watershed of about one-quarter of a square mile

the greater part of which is owned by the village. There are no houses upon this watershed and it is quite hilly and largely wooded. The auxiliary supply from Roaring brook has a watershed of about 3½ square miles and a population of about 100, which corresponds to a population of about 29 per square mile. The watershed is also quite hilly although only one-third of it is wooded while about one-third is under cultivation and a large part of the remainder is used for pasture.

The main supply has no apparent source of pollution except possibly wild animals. The Roaring brook supply, however, is open to serious pollution, chiefly from 3 or 4 privies located near the brook which were in an unsatisfactory condition; and from a barnyard with a manure pile on the edge of the brook.

At the time of the inspection samples of the village water were collected from a tap in the village and from the various intakes. Analyses of these samples together with those made previously by the Division of Laboratories and Research will be found in the appended table.

From the results of these analyses it will be seen that the main supply at the time of the inspection was of a satisfactory sanitary quality as shown both in the chemical and bacteriological analyses, while the sample obtained from the Roaring brook supply was seriously contaminated as shown by the high bacterial count, the presence of organisms of the B. coli type in 1 c.c. inoculations and by the high oxygen consumed and chlorine figures. The samples collected during the past eight years have occasionally shown high counts of bacteria and organisms of the B. coli type in 10 c.c. inoculations. There is no means of determining, however, whether these samples were from the main supply or from the Roaring brook supply. The water as shown by the past analyses in general has contained moderate amounts of nitrogen in its various forms with the exception of that found in the nitrate test which has been quite high. These high figures for nitrates are undoubtedly due to the organic nitrogen which had become oxidized in the natural process of purification. The water is moderately hard and is usually free from color and turbidity.

As a result of this investigation and analyses the following conclusions may be drawn:

1. That the main supply from Horse and Lightning brooks is apparently of a satisfactory sanitary quality as shown by the sanitary survey and by the analyses.
2. The water from the auxiliary supply obtained from Roaring brook is evidently unsatisfactory from a sanitary standpoint on account of the possibility of pollution from the insanitary privies and barnyard near the brook, this condition being verified by the analytical results. While it has been the custom to use this supply only at such times as the water is clear and contains little or no surface water, yet it is quite possible that pollution might be present from drainage from these privies and stables near the brook.

In view of the above conclusions, I would make the following recommendation:

That, in case it is intended to continue the use of the auxiliary supply from Roaring brook, the insanitary conditions existing at the present time upon the watershed be eliminated and if any difficulty is found in improving these conditions that application be made to this Department for the enactment of rules and regulations for the protection of the watershed.

I would further recommend that copies of this report be sent to the village authorities, the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 1, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			Bacteria per c.c.; gelatin 20°, 48 hours	B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
Malone	Franklin	Tap, public supply	3/30/09	Tr.	Cl.			112		92	.010	.020	.002	1.20	0.35	0.87	89.0	79.0	250	—	+	—
Malone	Franklin	Tap, public supply	2/10/10	Tr.	Tr.			121		100	.005	.016	.003	1.20	1.00	0.75	89.0	81.0	1,000	—	—	—
Malone	Franklin	Tap, public supply	11/12/12	Tr.	Cl.			115		92	.012	.006	.002	4.80	0.40	1.00	91.0	90.0	20	+	—	—
Malone	Franklin	Tap, public supply	3/10/13	Tr.	Cl.			119		98	.010	.036	.002	0.90	0.50	1.50	96.0	86.0	50	—	—	—
Malone	Franklin	Tap, public supply	10/ 6/11	Tr.	Cl.			158		148	.004	.014	.001	0.70	0.30	0.50	85.0	85.0	700	+	—	—
Malone	Franklin	Tap, public supply	11/15/11	5	Cl.			113		99	.010	.024	Tr.	1.20	0.80	1.00	84.0	83.0	110	+	—	—
Malone	Franklin	Tap, public supply	1/ 6/12	Tr.	Cl.			105		86	.008	.010	.001	1.08	0.30	1.12	86.0	84.0	150	—	—	—
Malone	Franklin	Tap, public supply	2/ 9/12	Tr.	Cl.			109		97	.020	.022	Tr.	1.20	0.50	0.50	87.0	85.0	50	+	—	—
Malone	Franklin	Tap, public supply	3/15/12	Tr.	Cl.			117		98	.012	.022	.001	1.20	0.50	0.50	94.0	85.0	170	—	—	—
Malone	Franklin	Tap, public supply	4/18/12	5	Cl.			112		92	.002	.028	.001	0.80	1.50	0.75	85.0	81.0	80	—	—	—
Malone	Franklin	Tap, public supply	9/ 6/12	Tr.	Cl.			125		100	.006	.008	.002	1.40	0.70	0.75	90.0	83.0	130	+	+	—
Malone	Franklin	Tap, public supply	10/21/12	Tr.	Cl.			113		94	.010	.050	.001	1.00	0.80	0.75	93.0	87.0	70	—	—	—
Malone	Franklin	Tap, public supply	12/ 5/12	Tr.	Cl.			101		90	.008	.026	.001	1.00	2.00	0.50	89.0	78.0	60	—	—	—
Malone	Franklin	Tap, public supply	1/ 9/13	Tr.	Cl.			113			.014	.026	Tr.	1.00	2.10	0.50	83.0	83.0	50	+	—	—
Malone	Franklin	Tap, public supply	2/13/13	Tr.	Cl.			120			.010	.024	Tr.	1.00	0.60	0.75	93.0	79.0	140	—	—	—
Malone	Franklin	Tap, public supply	3/27/13	Tr.	Cl.			96			.012	.020	Tr.	0.90	1.60	0.75	84.0	81.0	80	—	—	—
Malone	Franklin	Tap, public supply	5/ 8/13	Tr.	Cl.			114			.005	.008	.001	0.70	0.40	1.00	89.0	85.0	110	+	—	—
Malone	Franklin	Tap, public supply	7/24/13	Tr.	Cl.			129			.020	.034	Tr.	0.70	0.30	0.75	89.0	86.0	550	+	+	—
Malone	Franklin	Tap, public supply	5/14/14	2	1			119		98	.004	.008	.001	1.00	1.00	0.50	84.0	84.0	70	+	—	—
Malone	Franklin	Tap, public supply	6/24/15	1	Tr.			122		102	.002	.010	.001	1.20	1.50	1.00	88.6	84.0	20	+	—	—
Malone	Franklin	Tap, public supply	5/ 2/17																90	0+3—	0+3—	0+3—
Malone	Franklin	Intake, main supply	5/ 2/17	Cl.	Tr.						.018	Tr.	Tr.	Tr.	0.70	1.00	97.1	90.0	20	0+3—	0+3—	0+3—
Malone	Franklin	Intake, Roaring brook supply.	5/ 2/17	20	Tr.						.009	.026	Tr.	Tr.	3.80	1.50	52.9	45.0	220	3+0—	1+2—	0+3—

MANCHESTER

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of the village of Manchester, Ontario county. An investigation of this supply was made on December 7, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. J. H. Pratt, health officer, and Mr. John Gillman, superintendent of water and streets.

Manchester is an incorporated village in the northwestern part of Ontario county and about 25 miles southeast of Rochester. It is on the Canandaigua outlet and the Lehigh Valley railroad. The Auburn branch of the New York Central and Hudson River railroad passes through Shortsville, which is about 1 mile south of Manchester. Many of the residents of Manchester work on the Lehigh railroad, it being a terminal for freight business in this part of the State. The population at the time of the inspection was estimated to be about 1,115.

There are no public or private sewers in the village. Excretal and other wastes are disposed of in septic tanks, cesspools and privies.

The water supply is owned by the village and is under the control of the board of water commissioners. The waterworks were designed by Mr. C. C. Hopkins, civil engineer, of Rochester, and were constructed by contract under his direction in 1916.

The water supply is obtained from a dug well about 1⅓ miles west of the village. Water from this well is pumped at a pumping station located near the well direct to the village mains and to a standpipe in the southwestern part of the village. This supply being newly installed, only about 37 per cent of the total population are as yet connected with the supply, although new connections are being made continually. The average daily consumption was estimated to be about 35,000 gallons. There are about 4 miles of water mains varying in size from 4 inches to 10 inches in diameter. Water is distributed by pumping and the average pressure in the village is about 60 pounds per square inch. Hydrants are placed in various parts of the village for fire protection.

The well from which the water is obtained is about 40 feet in diameter and 15 feet deep and was sunk through sand and gravel. At the time of the inspection the water was about 13½ feet deep, the well holding about 17,000 gallons. The sides of the well are of plain concrete and the roof is of reinforced concrete, there being a manhole opening in the top to allow for inspection. The roof is about half a foot above the general surface of the ground in the vicinity. With the pumps operating, the water in the well is not lowered more than 5 feet.

The pumping station located adjacent to the well is 19 by 24 feet in plan and is constructed of brick. The pumping equipment is in duplicate and consists of two Gould triplex single-action plunger gear-driven 7-inch by 8-inch pumps. Each of the pumps is operated by a Fairbanks-Morse 15 horsepower electric motor. One of the pumps is so arranged that it can be automatically operated according to the pressures in the mains. Each pump has a capacity of about 175 gallons a minute.

The standpipe is of steel, 18 feet in diameter, 110 feet high, and has a capacity of about 213,000 gallons. The plant being new, no necessity has yet arisen to clean the standpipe. The street mains are flushed out through the hydrants about once a month.

The well is located several hundred feet from the road and near the edge of a swamp. About one acre of land is owned by the village and there is apparently no direct source of pollution near the well.

At the time of the inspection a sample of the water was collected from a tap in the village and the results of the analysis of this sample are shown in the appended table.

From the results of this analysis it will be seen that the water is slightly colored and turbid and very hard. The high figure for chlorine is probably due largely to the local rocks, which are of the Salina group. The figures for free ammonia and oxygen consumed are somewhat high and apparently indi-

cate the presence of organic matter, derived probably from the nearby swamp. The bacterial count is very low and organisms of the B. coli type were not found in the 10 c.c. inoculations tested.

As a result of this investigation and of the analyses, the following conclusion may be drawn:

That the water supply of the village of Manchester is apparently of a satisfactory sanitary quality, although containing a small amount of color derived from the swamp near the well.

As a measure of precaution, I would make the following recommendation:

That any buildings constructed within 500 feet of the well should be provided with privies having removable tight containers and that every effort be made by the village authorities to maintain the surroundings within 500 feet of the well in a satisfactory sanitary condition. I would also recommend that copies of this report be sent to the village authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 27, 1917

REPORT OF WATER ANALYSIS FOR MANCHESTER

Source		Tap in village
Collected on		12/7/16
Color		5
Odor, hot		1 v.
Odor, cold		1 v.
Turbidity		5
Solids, total		371
Loss on ignition		41
Mineral residue		330
Ammonia, free		.036
Ammonia, albuminoid		.008
Nitrites		.003
Nitrates		0.02
Oxygen consumed		1.90
Chlorine		10.75
Hardness, total		271.5
Alkalinity		224.0
Bacteria per c.c		5
B. coli type	10 c.c.	0+3—
	1 c.c.	0+3—
	1/10 c.c.	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

MASSENA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of an outbreak of typhoid fever in the village of Massena, made on March 8, 1917, by Mr. E. S. Chase, assistant engineer, acting in co-operation with Dr. C. R. Hervey, sanitary supervisor, and Dr. E. H. Hackett, health officer.

On March 5 a report was received from Dr. Hervey stating that several cases of typhoid had occurred recently in Massena and that the evidence at that time pointed to the public water supply as the source of the infection. In view of the fact that from several investigations previously made by the Department this water supply was known to be of questionable sanitary quality, an investigation was immediately started to determine what definite connection might exist between the water supply and the typhoid outbreak.

Information obtained from Dr. Hackett disclosed the fact that some 13 cases of typhoid had occurred in Massena with dates of onset subsequent to the 1st of January. The data obtained with respect to these cases are given in detail in the appended table.

From a study of this table and other general information it is apparent that the only source of food or drink used in common by all cases was the public water supply. Of the 13 cases, 6 obtained milk from Hammill, 4 from Allen, 2 from Garvis and 1 from Tyos. The first 2 dealers supply practically all of the milk sold in Massena and are said to obtain their supply of milk from independent sources. The time of year excludes the possibility of infection from flies or green vegetables. There is no evidence of contact, the cases being scattered fairly uniformly throughout the village, the occupations and ages are diverse. In connection with the ages, it should be noticed that there is no preponderance of cases among very young children as would be the case were the infection milk-borne.

The epidemiological evidence outlined above thus points directly to the public water supply as the source of infection. This supply is pumped from the St. Lawrence power canal treated with liquid chlorine and filtered through two pressure mechanical filters. The waterworks system has been described in previous reports upon investigations made heretofore and the details of the system remain practically the same as described in the former reports. While the water is ordinarily treated with liquid chlorine and filtered through pressure filters, it appears that during the latter part of December, 1916, and the first part of January, 1917, it became necessary to interrupt the operation of the purification plant in order to make repairs and to replace defective parts. The chlorine apparatus was out of operation from January 1 to February 16 and the filters were out of service from about Christmas time to March 5.

The unsafe character of the raw St. Lawrence river water has been clearly and fully pointed out in our previous reports. Furthermore there is a possibility of local pollution of the power canal by laborers working on the dredges stationed above the intake or by laborers engaged in maintaining an open channel through the ice above the spillway of the dam. In this connection it is significant to note that occasional cases of typhoid fever had occurred among the laborers employed by the Aluminum Company during the past year and very shortly before the outbreak.

The past reports of this Department have made the following recommendations:

1911

1. That the St. Lawrence Water Company take steps to improve the quality of water supplied by their works to the people of Massena by
   (a) Subjecting the raw water to a period of sedimentation of several hours before passing it through the filters or else providing storage for filtered water so that it will be unnecessary to pump from the canal during turbid times.
   (b) Increasing the filter area to reduce the rates of filtration, allow more flexibility of operation, and make it possible to put at least one unit out of operation in case of emergency.
   (c) Installing approved appliances for feeding coagulant in proper quantities at all times.
2. That the St. Lawrence Water Company make and keep a record of the physical, chemical and bacteriological tests which are customarily made of the raw and filtered waters in an efficiently operated filter plant, in order that the best results may be obtained at all times.
3. That frequent and thorough inspections be made by the Board of Health and the St. Lawrence Water Company of the sanitary conditions in the canal and upon the watershed tributary to the canal with a view of discovering and preventing any accidental or wilful pollution of the public water supply.

1915

In view of the failure of the water company to carry out the previous recommendations of this Department, it does not appear necessary at this

time to make additional recommendations. These earlier recommendations, as given in detail above, should, however, receive the immediate attention of the St. Lawrence Water Company.

1916

1. That the water company give their immediate attention to those recommendations of this Department, which have not as yet been carried out.

2. That at times of turbid water the amount of chlorine applied be increased to at least 0.40 part per million by weight.

3. That scales be provided for daily weighing of the cylinders of chlorine in order that a check may be had upon the accuracy of the chlorine control meter.

From our records, therefore, it appears that no appreciable efforts were made by the water company between 1911 and 1915 to properly purify the water supply. Between 1915 and 1916 the chlorine apparatus was installed and improvements made in the method of applying the alum to the water before filtration. Between the time of the report of 1916 and the present date, regular analyses have been made by the water company at monthly intervals and scales provided for the weighing of chlorine cylinders as a check upon the accuracy of the control apparatus. Furthermore extra parts for this apparatus have been provided in order to facilitate such repairs as might become necessary. No steps, however, have been taken by the water company to install a sedimentation basin prior to filtration nor to increase the filter area.

At the time of the inspection samples of raw and treated water were collected and the results of the analyses of these samples by the Division of Laboratories and Research, together with the results of presumptive tests for B. coli made by the laboratory of the aluminum company will be found in the appended table.

The results of the analyses made by this Department show the contaminated condition of the raw water from the canal. The low counts and absence of organisms of the B. coli type in the samples of the treated water indicate that the purification process was effective at the time of the investigation. The analyses of the aluminum company indicate that, during the time the purification plant was out of service, the water as delivered was actively contaminated.

In conclusion, it may be stated that the information obtained eliminates contact, carriers, raw food and milk as causes of the outbreak, leaving the public water supply as a common factor in all the cases. The fact that during the period from January 1 to February 16 the water was receiving no purification and that during this period the majority of cases had their onsets, is conclusive evidence that the water supply, derived from a source which is known to be contaminated, was the cause of the outbreak.

I would, therefore, recommend:

1. That the water company operate continuously, and not intermittently as in the past, the chlorine plant for sterilization of the water supply furnished by them. At no time should the amount of chlorine applied be less than 0.25 part per million by weight and at times of turbidity the amount applied should be increased to not less than 0.4 part per million.

2. That the water company take more care to keep the filters in proper operating condition in order that continuous service may be maintained.

3. That the water company otherwise carry out as soon as possible such previous recommendations of this Department as have not as yet been acted upon.

4. That the local board of health arrange for regular inspections of the water purification plant at such frequent intervals as may be found necessary to insure constant operation of the plant.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *March* 21, 1917

TYPHOID CASE DATA—MASSENA N. Y., 1917

No.	NAME AND ADDRESS	Age	Occupation	Probable date onset	Water	Milk	Remarks
1	George McClay	26	Laborer, Aluminum Co.	Dec. 26, 1916	Village	?	Sent to hospital, Cornwall, Ont. Died.
2	John Hahany	23	Laborer, Aluminum Co.	Jan. 1, 1917	Village	?	
3	Viola Sanborn, East Orvis street	2		Jan. 13, 1917	Village	Hammill	
4	Paul Feutell	23	Laborer, Aluminum Co.	Jan. 19, 1917	Village	Tyo	Sent to Malone hospital.
5	Ethel Bell, Main street	5		Jan. 20, 1917	Village	Allen	
6	Ira Hamilton, Pine street	21	Laborer, Aluminum Co.	Jan. 26, 1917	Village	Hammill	Sent to Malone hospital. Died.
7	Mike Dunko, Railroad avenue	27	Laborer, Aluminum Co.	Feb. 4, 1917	Village	Allen	
8	Edgar Dumas, East Orvis street	10	School	Feb. 10, 1917	Village	Garvis	
9	Fred Amo, East Orvis street	31	Paymaster's clerk, Aluminum Co.	Feb. 14, 1917	Village	Hammill	Sent to hospital, Cornwall, Ont.
10	Mrs. Thomas Walsh, Water street	35	Housewife	Feb. 14, 1917	Village	Hammill	
11	Joseph Jacobs, near East Orvis street	21	Laborer, Aluminum Co.	Feb. 21, 1917	Village	Garvis	
12	Rita Marion, Center street	6	School	Feb. 25, 1917	Village	Allen	
13	Wilfred Hill, East Orvis street	8	School	Feb. 25, 1917	Village	Hammill	
14	May Billings, near East Orvis street	15	School	Feb. 25, 1917	Village	Hammill	
15	Walter Goolden, Bridges avenue	42	Aluminum Co.	Mar. 2, 1917	Village	Allen	

RESULTS OF WATER ANALYSES FOR MASSENA, N. Y.

SOURCE OF SAMPLE	Date of collection	BACTERIOLOGICAL			
		Bacteria per c. c. gelatin 20° 48 hours	B. COLI TYPE + PRESENT — ABSENT		
			10 c.c.	1 c.c.	1/10 c.c.
Raw, canal water	3/ 8/17	45	3+0—	3+0—	0+3—
Chlorinated water*	3/ 8/17	20	0+3—	0+3—	0+3—
Chlorinated and filtered water	3/ 8/17	5	0+3—	0+3—	0+3—
		Analyses by Aluminum Company Presumptive tests for B. Coli			
Raw, canal water	10/27/16	.....	.....	—	.....
Village supply	10/27/16	.....	.....	—	.....
Mill supply	10/27/16	.....	.....	—	.....
Raw water	11/17/16	.....	—	—	.....
Village supply	11/17/16	.....	—	—	.....
Mill supply†	11/17/16	.....	—	—	.....
Raw water	12/20/16	.....	—	—	.....
Village supply	12/20/16	.....	—	—	.....
Mill supply†	12/20/16	.....	—	—	.....
Raw water†	1/17/17	.....	+	?	.....
Village supply†	1/17/17	.....	+	?	.....
Mill supply†	1/17/17	.....	+	?	.....
Raw water	2/20/17	.....	—	—	.....
Village supply	2/20/17	.....	—	—	.....
Mill supply	2/20/17	.....	—	—	.....

* Mill supply, chlorinated only.
† Purification plant out of operation.

McGRAWVILLE

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of the village of McGrawville made by Mr. E. S. Chase, assistant engineer, on December 22, 1916.

McGrawville is an incorporated village with a population of about 887, located in the central part of Cortland county, about 5 miles east of the city of Cortland. It is on the Cincinnatus branch of the D., L. & W. railroad, and is the terminus of the trolley line from Cortland. It is largely residential although there are one or two small factories in the village. The village has no sewer system and the houses are served by privies and cesspools.

The water supply is derived from several drilled wells located near the center of the village. The waterworks were constructed in 1908 and are owned and operated by the municipality under the direction of the board of water commissioners of which Mr. G. H. Miracle is president.

Approximately 90 per cent of the population are served with the supply as are also the railroad and factories. The daily water consumption may be estimated at approximately 75,000 gallons per day or 85 gallons per capita. There are between 3 and 4 miles of water mains ranging in size from 4 inches to 8 inches in diameter. Of the 225 service taps, approximately 100 are metered. The water from the wells is pumped into the distribution system against a pressure of approximately 115 pounds per square inch, maintained by a standpipe located on a side hill about three-fourths of a mile

northwest of the village center. There are at present 9 wells in use, 5 of which were drilled in 1908 and 4 of which were drilled about 1913. Little data could be obtained regarding these wells, either with respect to their size or depth. It was stated that they were possibly 65 feet deep and passed through strata of loam and gravel into shale. The depth at which the shale was encountered could not be determined but it was stated that rock was generally found throughout the village at about 30 feet below the surface. The wells are said to be cased to the rock and are direct connected to the pump.

The pumping equipment is housed in a small concrete building and consists of a 25 horse-power steam engine belted to a 60 gallon per minute triplex pump. The steam for the operation of the pumping equipment is derived from an adjacent box factory.

The standpipe is constructed of steel and is about 30 feet in diameter by 65 feet in height and has a capacity of about 350,000 gallons.

The wells are located not far from a thickly settled portion of the village and while their exact location could not be determined on account of the depth of snow upon the ground it is evident that they are somewhat unsatisfactorily situated on account of the proximity of the inhabited portion of the village. The privy of the box factory near the pump house is probably within 100 feet of the nearest well, while beyond 100 feet and within 500 feet there are about 5 houses, and beyond 500 feet and within 1,000 feet there are probably 12 houses. About 50 feet from the wells flows Trout brook, a tributary to the Tioughnioga river. It is said, however, that the water level of the wells is not affected by the height of the water in the brook.

Subsequent to the time of the inspection, samples of water were collected by Dr. Ensign, health officer, and sent to the Division of Laboratories and Research for analyses, the results of which together with others made in the past will be found in the appended table.

The results of these analyses show a clear, colorless and hard water. The figures for nitrogen in its various forms are somewhat high for unpolluted ground waters, high figures for nitrates frequently indicating the occurrence of considerable organic pollution in the ground water supply. The figures for chlorine are also rather high and taken in conjunction with the high figures for nitrates indicate the presence of past pollution. The total bacterial counts, however, are on the whole moderately low, and, with three exceptions in the series of 23, organisms of the B. coli type are absent. From the inspection, however, it appears that there are numerous sources of possible pollution in the neighborhood of the wells as is always true where wells are located in the vicinity of a thickly-settled community. While the analyses indicate that the contamination reaching the ground water has been on the whole rendered inactive by the natural processes of purification, there is no positive assurance that such will continue to be the case under different hydraulic conditions of the ground water flow.

In view of the above facts the following conclusions may be drawn:

1. That the public water supply of the village of McGrawville while of a reasonably satisfactory physical quality is derived from wells which are not satisfactorily located with respect to their proximity to a thickly-settled portion of the village and to numerous potential sources of contamination.
2. That the analyses indicate the occurrence of past pollution rendered inactive, however, by the natural processes of purification.
3. That it is impossible to predict the continuance of satisfactory purification by these natural processes.

I would, therefore, recommend:

1. That the village authorities take steps to improve the sanitary conditions in the vicinity of the wells by providing all privies within the radius of 500 feet with water-tight removal containers, the contents of which to be disposed of at satisfactorily frequent intervals at some point remote from the wells and in such manner as to bring about no possibility of nuisance or of pollution of the water supply.

2. That frequent analyses of the supply be made at regular intervals, and that in case active contamination is found at any time steps be taken to determine and eliminate the source or to adequately purify the supply by sterilizing with liquid chlorine.

3. That in case it is impossible or impracticable to carry out the above recommendations the village consider the advisability of abandoning the present supply and developing a new supply free from all possibilities of contamination.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *February* 27, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
McGrawville...	Cortland	Tap	7/29/09	Tr.	2			148		121	.012	.034	.004	2.40	0.10	6.75	117.0	86.0	160	+	−	−
McGrawville...	Cortland	Tap	6/ 9/10	Tr.	Cl.			149		121	.002	.020	.003	2.00	0.40	7.50	92.0	83.0	45	−	−	−
McGrawville...	Cortland	Tap	12/ 3/10	5	Cl.			163		107	.006	.042	.002	1.92	0.60	8.50	106.0	100.0	30	−	−	−
McGrawville...	Cortland	Tap	12/15/10	Tr.	Cl.			173		136	.006	.042	.002	1.60	0.20	8.50	103.0	96.0	5	−	−	−
McGrawville...	Cortland	Tap	2/28/11	Tr.	Cl.			166		150	.005	.056	.006	2.00	1.00	9.25	91.0	91.0	16	−	−	−
McGrawville...	Cortland	Tap	10/19/11	Tr.	Cl.			160		133	.034	.068	.030	1.80	0.20	10.37	120.0	106.0	30	−	−	−
McGrawville...	Cortland	Tap	11/15/11	Tr.	Cl.			190		170	.020	.034	.052	1.80	0.40	10.37	134.0	122.0	40	−	−	−
McGrawville...	Cortland	Tap	12/29/11	Tr.	Cl.			185		149	.024	.014	.020	2.80	0.50	10.00	111.0	111.0	14	−	−	−
McGrawville...	Cortland	Tap	2/ 8/12	Tr.	Cl			173		152	.008	.018	Tr.	3.60	0.40	9.50	120.0	109.0	150	+	−	−
McGrawville...	Cortland	Tap	3/18/12	Tr	Cl.			176		154	.018	.026	.001	3.20	0.20	9.00	106.0	100.0	350	+	−	−
McGrawville...	Cortland	Tap	4/29/12	Tr.	Cl.			161		144	.004	.036	.001	2.80	0.10	8.25	100.0	94.0	300	+	−	−
McGrawville...	Cortland	Tap	9/25/12	Tr.	Cl.			210		186	.012	.022	.001	2.40	0.40	8.50	149.0	136.0	120	+	−	−
McGrawville...	Cortland	Tap	10/30/12	Tr.	Cl.			210		173	.010	.062	Tr.	2.60	0.60	6.25	149.0	143.0	10	−	−	−
McGrawville...	Cortland	Tap	11/29/12	Tr.	Cl.			204		177	.010	.044	Tr.	3.00	1.00	9.00	160.0	146.0	20	−	−	−
McGrawville...	Cortland	Tap	12/28/12	Tr.	Tr.			202		180	.026	.036	Tr.	3.00	0.40	8.50	154.0	142.0	10	−	−	−
McGrawville...	Cortland	Tap	2/ 5/13	Tr.	2			211			.008	.026	Tr.	2.60	0.60	8.00	146.0	141.0	10	−	−	−
McGrawville...	Cortland	Tap	3/19/13	Tr.	Cl.			202			.018	.028	Tr.	2.10	0.70	8.75	137.0	133.0	10	−	−	−
McGrawville...	Cortland	Tap	5/14/13	Tr.	Cl.			204			.008	.020	.001	1.70	0.70	6.75	134.0	129.0	70	−	−	−
McGrawville...	Cortland	Tap	6/18/13	2	Tr.			201			.004	.002	Tr.	2.00	0.70	7.00	131.0	130.0	20	−	−	−
McGrawville...	Cortland	Tap	7/23/13	Tr.	Cl.			204			.004	.012	.006	2.20	0.60	7.00	137.0	133.0	.....	−	−	−
McGrawville...	Cortland	Tap	4/28/14	Tr.	Tr.			218		182	.014	.024	.001	3.40	0.60	8.75	143.0	141.0	5	−	−	−
McGrawville...	Cortland	Tap	12/26/16	Tr.	Cl.	1 v.	1 v.				.002	.004	.001	1.60	1.00	3.75	160.0	131.0	15	−	−	−
McGrawville...	Cortland	Tap	12/26/16																20	−	−	−

MECHANICVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Mechanicville, made by Mr. C. M. Baker, assistant engineer, on June 20, 1917.

Mechanicville is a city of 8,208 inhabitants, located in the southeast corner of Saratoga county, on the west bank of the Hudson river, 20 miles north of Albany. It is on the D. & H. R. R., and may also be reached by trolley. A system of public sewers discharges into the Hudson river, without treatment of the sewage.

The supply was first put into service in 1893, and originally consisted of an impounding reservoir on Plum brook, at a point about 4 miles northwest of the village from which the water flowed by gravity to the distributing system. Later, however, in 1909, an intake, a purification plant and pumping station were installed about 1¼ miles below the reservoir. The water from this lower intake flows through the purification plant into a clear water well, from which it is pumped into the main leading from the reservoir to the village. The pressure from the pumps, however, is usually greater than that from the reservoir, and it is thus evident that when the pumps supply sufficient water for the consumption only filtered water enters the distribution system.

As will be pointed out later the pumps do not at all times supply sufficient water so that unpurified water undoubtedly frequently enters the system.

Practically all of the population of the city is served with the water, there being about 1,100 service taps, all of which are metered. There are some 22 miles of mains ranging in size from 4 to 16 inches in diameter. The pressure in the main part of the city ranges from 80 to 85 pounds per square inch. In a portion of the city located at a higher elevation, however, the pressure is only 40 to 50 pounds. The average consumption is approximately 1,300,000 gallons per day, the maximum 1,500,000 gallons, and the minimum 1,000,000 gallons daily. These figures correspond to per capita rates of 158, 183 and 122 gallons, respectively. About 60 per cent of the water is used by the railroads and manufacturing concerns.

Auxiliary fire protection is provided by means of a cross connection with the mains of the West Virginia Paper Mills, whereby water may be pumped from the Hudson river by the mill into the distribution system. Double check valves are provided at this place, however, in order to check the flow of water from the mills into the city distribution system under ordinary conditions. The superintendent of the mills stated that they pumped water into the distribution system of the city only upon special request from a city official.

The purification plant consists of a small impounding reservoir, about 1,000,000 gallons in capacity, from which the water flows by gravity to a roughing filter, thence through gravity mechanical filters into a clear water basin, from which it is pumped into the distribution system as stated above. The main storage or impounding reservoir on the upper part of Plum brook is formed by the construction of an earthen dam, with a clay puddle core across the bed of the stream. The capacity of this reservoir is estimated at 90,000,000 gallons. The intake at the upper impounding reservoir consists of a steel tower extending from the bottom of the reservoir to above the water surface. Screens are provided to prevent large floating material from entering the mains. At the filter plant a screened opening through the dam forming the lower reservoir allows the water to flow from the reservoir onto the roughing filter. At times of flood water may also overflow this wall onto the roughing filter and thence over a spillway into the creek below.

The pumping station and filter plant are housed in a brick building. The pumping equipment consists of two Worthington pumps, one with a capacity of 1,500,000 gallons daily and the other 750,000 gallons per day. Power is furnished by means of one 70 horsepower steam boiler. It is necessary to shut down the pumping plant once a month in order to overhaul the boiler. During this period the city is supplied by water directly from the large impounding storage reservoir.

The area of the watershed tributary to the storage reservoir is about 1.85 square miles, and to the lower intake, at the purification plant, 4.27 square miles. The total population on the watersheds tributary to the supply is about 190, the density of population on each watershed being about the same and equivalent to approximately 30 persons per square mile. About 25 per cent of the area is wooded, the rest being used for farming and agricultural purposes. The slopes are generally quite precipitous. Rules and regulations for the sanitary protection of the watershed were enacted by this Department in 1907. No violations have been reported by the city officials in their annual reports.

An inspection of the watershed was made at the time of the present investigation and, although the buildings were found to be located well back from the streams in most cases, the following sources of pollution and possible violations of the water rules were observed:

1. At the farm occupied by Mr. Wilbur, near the upper edge of the reservoir, a privy, provided with no vault, and a barn are located on the bank of the reservoir. Fecal matter was observed on the ground in the vicinity.
2. At the farm of Orville Shepard, about half a mile above the reservoir, a spring feeder has its source near the barn.

The purification plant is located on the bank of Plum brook, about 2 miles northwest of the city. The roughing filter is 53 by 57 feet in plan and is provided with about 4 feet of gravel. The rate of filtration through it, based upon the average consumption, is approximately 14,000,000 gallons per acre per day. The gravity mechanical filters, 4 in number, are provided with about 3 feet of sand resting upon 6 to 12 inches of gravel. The filters are underdrained by a pipe system which is equipped with perforated cup-shaped strainers. The main drains through the center of each bed are 8 inches in diameter and the laterals 1¼ inches, the laterals being spaced about 9 inches apart. From the filters the water flows directly into the clear water wells.

The maximum rate of filtration through the mechanical filters is about 51,000,000 gallons per acre per day and the minimum 34,000,000 gallons per day. The filters are cleaned when they fail to supply sufficient water to meet the demands of the pumps; in other words, the filters are washed when the elevation of the water in the clear water well begins to fall. The frequency of washings depends upon the condition of the water and varies from 3 to 36 hours. The filters are washed until the wash water is clear. No provision is made for filtering to waste after washing. The clear water well is 10 by 37 feet in plan by 5 feet deep and has a capacity of about 14,000 gallons. No alum or other chemical is used as coagulant in connection with the operation of the purification plant. It is stated that the filters were constructed for the purpose of removing turbidity from the water and it is said that they are successful in this respect.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which, together with those of previous analyses, are recorded in the appended table.

The results of these analyses show a water frequently high in color and turbidity, also a water that is high in hardness. The figures for nitrogen in its various forms are moderate but those for oxygen consumed and chlorine appear to be rather high at times. The bacterial counts of samples collected from taps in the village are at times very high. Colon bacilli have been found present in practically all of the 10 c.c. inoculations, in a majority of the 1 c.c. inoculations and occasionally in the 1/10 c.c. inoculations, thus indicating the presence of considerable active and potentially dangerous contamination in the water. It is therefore evident that the purification plant is ineffective in removing pollution from the water and it is apparent furthermore that at times turbid water reaches the distribution system.

As a result of this investigation, it may be concluded:

1. That the water supply of the city of Mechanicville is derived from sources which are subject to pollution from inhabitants on the watershed and visitors thereto.
2. That the privy on the Wilbur farm, near the head of the storage reservoir, constitutes a serious menace to the sanitary quality of the supply.
3. That the purification plant is ineffective in removing this pollution.
4. That the water is at times used without purification.
5. That polluted water from the Hudson river is at times pumped into the distribution system, due to lack of adequate pumping equipment in connection with the city supply.

In view of the above, I beg to offer the following recommendations to be acted upon by the city authorities:

1. That greater care be exercised in making inspections of the watershed in order that all violations of the water rules may be located and abated.
2. That the privy at the Wilbur farm be moved to a greater distance from the reservoir and that it be provided with a watertight container which shall be properly cleaned at regular intervals.
3. That, regarding purification:
   (a) Apparatus be provided as soon as possible and the supply be sterilized with liquid chlorine.
   (b) Coagulating basins be provided and the water be suitably treated with a coagulant before passing upon the mechanical filters.
   (c) The piping be rearranged so that water may be filtered to waste after washing.
4. That the necessary changes be made and suitable pumping equipment be provided so that no unpurified water will at any time enter the distribution system.
5. That suitable storage or pumping equipment be provided in order to make it unnecessary to pump unpurified water from the Hudson river or other polluted source into the distribution system in case of fire.

In conclusion, I would futher recommend that copies of this report be transmitted to the local authorities and the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 2, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Mechanicville..	Saratoga.....	Tap, public supply.....	2/ 6/11	20	30	....	....	155	....	105	.103	.116	.003	0.40	4.90	1.50	92.9	88.0	3,600	+	—	—
Mechanicville..	Saratoga.....	Tap, public supply.....	4/27/11	15	20	....	....	127	....	24	.028	.130	.004	0.20	7.00	1.00	54.3	44.0	1,300	+	—	—
Mechanicville..	Saratoga.....	Tap, public supply.....	6/21/11	15	5	....	....	199	....	184	.005	.034	.002	Tr.	2.60	1.23	137.2	137.0	100	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	7/ 6/11	15	7	....	....	200	....	159	.010	.036	.001	0.30	3.20	1.25	145.6	140.0	500	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	8/30/11	10	5	....	....	175	....	139	.018	.138	.010	0.10	4.40	1.75	128.6	127.0	3,700	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	10/ 6/11	10	10	....	....	122	....	108	.056	.088	.002	0.10	2.20	1.50	142.2	130.0	180	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	11/ 2/11	....	5	....	....	181	....	140	.016	.122	.002	0.20	4.70	1.50	40.0	82.0	170	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	12/13/11	17	25	....	....	157	....	129	.020	.160	.003	0.20	3.48	2.12	88.6	82.0	550	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	1/17/12	25	20	....	....	124	....	101	.023	.132	.003	0.30	5.00	1.50	70.0	63.0	230	+	—	—
Mechanicville..	Saratoga.....	Tap, public supply.....	2/ 8/12	15	20	....	....	151	....	123	.024	.122	Tr.	0.26	4.00	1.50	75.7	74.0	190	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	3/14/12	10	130	....	....	112	....	70	.104	.156	.007	0.16	6.40	0.50	27.3	16.5	18,000	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	4/25/12	40	20	....	....	144	....	113	.010	.136	.001	0.08	6.60	1.50	72.9	70.9	1,600	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	9/20/12	20	5	....	....	171	....	140	.014	.040	.001	0.16	4.00	1.62	120.0	113.5	210	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	11/ 4/12	20	30	....	....	175	....	153	.012	.102	.001	0.10	6.20	2.00	111.2	104.0	500	+	+	+
Mechanicville..	Saratoga.....	Tap, public supply.....	1/17/13	20	15	....	....	126	....	....	.016	.094	.001	0.20	4.40	2.25	88.6	74.0	300	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	3/ 6/13	30	20	....	....	124	....	....	.010	.100	Tr.	0.14	4.70	1.75	75.7	75.0	700	+	—	—
Mechanicville..	Saratoga.....	Tap, public supply.....	4/24/13	30	45	....	....	177	....	....	.024	.116	.001	0.12	5.20	1.75	84.3	77.0	300	+	+	—
Mechanicville..	Saratoga.....	Tap, public supply.....	6/27/13	25	10	....	....	176	....	....	.005	.100	.001	0.08	4.10	1.50	114.2	109.0	100	+	—	—
Mechanicville..	Saratoga.....	Tap, public supply.....	4/10/14	30	120	....	....	92	....	61	.033	.210	.001	0.22	10.0	1.50	50.0	35.0	3,000	+	+	—
Mechanicville..	Saratoga.....	Raw, impounding reservoir..	6/20/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	100	2+1—	0+3—	0+3—
Mechanicville..	Saratoga.....	Raw, Baker brook.....	6/20/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	100	3+0—	2+1—	1+2—
Mechanicville..	Saratoga.....	Raw, influent to roughing filter.....	6/20/17	25	5	2 v.	2 v.	....	....	....	.012	.082	0	0.60	4.10	1.75	160.0	137.0	900	3+0—	2+1—	0+3—
Mechanicville..	Saratoga.....	Treated, final effluent from filter.....	6/20/17	10	0	3 v.	3 v.	....	....	....	.022	.060	0	0.10	3.50	1.75	162.8	154.0	80	3+0—	0+3—	0+3—
Mechanicville..	Saratoga.....	Treated, tap in city.....	6/20/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	350	3+0—	2+1—	0+3—

MIDDLEVILLE

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Middleville made by C. M. Baker, assistant engineer, on October 26, 1916.

Middleville is an incorporated village of 710 inhabitants located in Herkimer county on West Canada creek and the Adirondack division of the New York Central railroad, 9 miles north of Herkimer. There are several private sewer systems in the village, all of which discharge without treatment into the creek, but most of the houses are served with privies, cesspools, etc.

The water supply is owned by the municipality and is derived from a small spring brook about 2¼ miles northeast of the village. From the brook intake the water flows by gravity to a large storage reservoir about 1 mile from the village, thence to the consumers. The supply was first put into operation in 1895. Rules and regulations for protecting the sanitary quality of the supply were enacted by this Department in 1902. Practically all of the inhabitants are served with the water, there being in all 110 service taps, none of which are metered. The pressure in the village averages 160 to 190 pounds per square inch. Due to the lack of meters or other method of measuring the water used, no definite information could be obtained regarding the consumption; but, based on a per capita rate of 100 gallons daily, the total consumption would be approximately 71,000 gallons per day. Although previous information has indicated shortage of water at times, no mention was made of this fact by the village officials at the time of the inspection. There is a connection with the village system, however, whereby water from West Canada creek may be pumped by the pumps of the E. C. Mills Leather Company into the system in case of fire or shortage of the supply. Although no definite information was obtained at the time of the inspection that water had been pumped from this source, the existence of a connection whereby water may be pumped from the creek is objectionable, since it is subject to considerable direct pollution from villages above Middleville which discharge sewage into the stream without purification.

The storage reservoir is formed by earthen embankments the sides of which are rip-rapped. Drainage ditches are provided to divert all surface wash and the reservoir is fenced. Its capacity is about 21,000,000 gallons, which is equivalent to 280 days' consumption, based upon a 100 gallons per capita rate. The intake consists of a small dam across Kenyon brook at a point about 1 mile northeast of the reservoir. This dam forms a small impounding reservoir of about 40,000 gallons capacity and diverts the water into an intake basin which is protected by a half-inch mesh screen. This reservoir is enclosed by a fence which is placed only 10 or 12 feet from the edge of the reservoir. The storage reservoir is usually cleaned each year during low water, at which time water is drawn directly from the brook intake to supply the demand. Due to trouble from algae, copper sulphate is used in the reservoir nearly every year as needed. The intake is cleaned three or four times yearly.

The watershed tributary to the supply is about half a square mile in area and on it are located two houses with a total population of about 10 persons, or an equivalent of 20 per square mile. The source of the stream consists of springs located in a wooded area. Below the springs, however, and above the intake, the watershed is used mainly for pasture land. The buildings at the two farms located on the watershed are 200 feet or 300 feet from the stream. The barnyards of each, however, extend practically to the stream. It is apparent therefore that considerable pollution from cattle and livestock finds its way into the supply, also that there is some danger of pollution of human origin from inhabitants upon the watershed and also from trespassers thereon.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water that is at times somewhat colored and turbid. The figures for nitrogen in its various forms are at times high, as are also the figures for chlorine, thus indicating that pollution finds its way into the supply. The bacterial counts are in general high and at times very high. Colon bacilli are present in nearly all of the 10 c.c. inoculations, frequently in 1 c.c. and occasionally in 1/10 c.c. inoculations, thus indicating the presence of considerable active and potentially dangerous contamination. It is probable, however, that this pollution is mainly of animal rather than of human origin.

As a result of this investigation, it may be concluded that:

1. The water supply of Middleville is derived from a source which is subject to considerable pollution:
   (a) To some extent from residents and visitors on the watershed.
   (b) From cattle and livestock which have free access to the streams tributary to the supply.
2. That the large storage tends to remove this pollution to a certain extent before the water reaches the consumers, although complete purification is not effected, as is shown by the analyses; furthermore, at times of cleaning the reservoir no storage is provided.
3. That the connection whereby water may be pumped from West Canada creek provides a means for pumping polluted water into the distribution system.

In view of the above, I beg to offer the following recommendations to be acted upon by the village officials:

1. That additional storage be provided or that the large storage reservoir be divided into two parts in order to facilitate cleaning and eliminate the necessity of drawing the water directly from the intake reservoir during times of cleaning.
2. That very careful inspection and supervision of the sanitary conditions on the watershed be at all times maintained and that the rules and regulations protecting the sanitary quality of the supply be at all times rigidly enforced.
3. That careful consideration be given to the purification of the supply in order to improve its sanitary quality. This purification might consist either of filtration or possibly sterilization with liquid chlorine.
4. That the connection for pumping water from West Canada creek be removed.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 26, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Middleville	Herkimer	Tap, public supply	10/12/11	10	5	....	....	138	....	117	.022	.138	Tr.	0.04	2.20	0.90	114.2	108.0	230	+	+	−
Middleville	Herkimer	Tap, public supply	11/ 9/11	25	20	....	....	211	....	145	.010	.076	.001	0.20	3.70	1.75	111.4	110.0	950	+	+	−
Middleville	Herkimer	Tap, public supply	12/27/11	....	20	....	....	138	....	117	.044	.134	.002	0.40	3.30	0.87	114.2	107.0	2,400	+	+	+
Middleville	Herkimer	Tap, public supply	2/16/12	15	5	....	....	153	....	136	.096	.078	.007	0.68	1.40	1.50	128.6	128.0	160	+	+	−
Middleville	Herkimer	Tap, public supply	3/20/12	5	5	....	....	150	....	136	.064	.052	.004	0.64	1.90	1.25	120.0	119.0	1,400	+	+	−
Middleville	Herkimer	Tap, public supply	4/25/12	25	10	....	....	91	....	77	.034	.130	.003	0.36	17.0	0.50	54.3	53.0	1,800	+	+	−
Middleville	Herkimer	Tap, public supply	9/11/12	10	2	....	....	149	....	127	.014	.110	.001	0.12	2.70	1.00	120.0	117.0	900	+	+	−
Middleville	Herkimer	Tap, public supply	10/29/12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1,100	+	+	−
Middleville	Herkimer	Tap, public supply	11/30/12	10	10	....	....	140	....	123	.014	.094	.001	0.40	1.80	1.50	111.4	106.0	1,400	+	+	−
Middleville	Herkimer	Tap, public supply	1/16/13	20	5	....	....	143	....	....	.072	.064	.005	0.34	1.10	1.75	108.6	107.0	0	−	−	−
Middleville	Herkimer	Tap, public supply	2/22/13	20	Tr.	....	....	133	....	....	.060	.064	.005	1.00	2.00	1.50	100.0	98.0	800	+	−	−
Middleville	Herkimer	Tap, public supply	4/ 3/13	20	10	....	....	102	....	....	.014	.104	.001	0.30	1 00	2.50	74.3	71.0	600	+	−	−
Middleville	Herkimer	Tap, public supply	5/15/13	15	Tr.	....	....	128	....	....	.012	.086	.001	0.12	2.40	0.75	105.8	97.0	190	+	−	−
Middleville	Herkimer	Tap, public supply	5/21/14	17	5	....	....	106	....	89	.014	.124	.005	0.16	3.60	0.50	85.7	84.0	3,400	+	+	−
Middleville	Herkimer	Reservoir at intake	10/26/16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	950	3+0−	3+0−	1+2−
Middleville	Herkimer	Tap in village	10/26/16	5	5	....	....	....	....	....	.018	.102	.001	0.06	3.30	1.13	117.2	98.0	600	3+0−	3+0−	0+3−

MILFORD

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of the village of Milford, Otsego county. An investigation of this supply was made on November 23, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Mr. Charles Martindale, superintendent of the waterworks, and Dr. W. R. Seeber, health officer of the village.

Milford is an incorporated village in the south central part of Otsego county. It is about 10 miles south of Cooperstown and is on the Susquehanna river and the Cooperstown branch of the Delaware and Hudson railroad. The population at the time of the inspection was estimated to be about 560.

About half of the village is served by a public sewer which discharges into the Susquehanna river. The remaining portion of the village is served largely by cesspools and privies.

The water supply is owned by the village; Mr. O. A. Weatherby being president and Mr. Charles Martindale superintendent of the waterworks. The water system was designed by Mr. Lamb, civil engineer of Cooperstown, and was constructed by contract in 1894 under the supervision of Mr. Lamb.

The water supply is obtained from Hinman Hollow brook, a tributary to the Susquehanna river. The intake, about 2½ miles northwest of Milford, is located in the side of a small pond formed by the construction of a dam across the brook. Water from this intake flows by gravity to a reservoir located on the south side of the brook and several hundred feet from the intake. From the reservoir the water flows by gravity to the village. Reserve storage is also provided by Little pond, a small body of water about 25 acres in area owned by the village and located at the head of a tributary to the brook about 2 miles north and above the intake. Water can be drawn from this pond into the brook to augment its flow at such times as may be necessary.

There are about 3½ miles of water mains varying from 4 inches to 6 inches in diameter. Practically all of the 160 houses in the village are served by the supply. Water is distributed by gravity and the average pressure is from 60 to 86 pounds per square inch. The average daily consumption was estimated to be about 56,000 gallons.

The reservoir is of concrete and has a frame cover. It is about 20 by 80 feet in plan and 10 feet deep with a capacity of about 120,000 gallons, or about 2 days' supply. The reservoir is usually cleaned twice a year and the street mains are flushed about once a month.

Hinman Hollow brook has a watershed above the intake of about 6.2 square miles. The topography of the watershed is hilly, although there is a small amount of swamp land. About half of the watershed is used for pasture and about one-fourth is forested. There are about 40 houses on the watershed, which represent a total population of about 150. This corresponds to a population of about 24 per square mile. The water is somewhat turbid after heavy rains.

There are several opportunities for serious pollution of the brook from the various houses and their accompanying privies and barnyards on the watershed, the worst cases being as follows:

1. A barn and manure pile about 50 feet from the brook and about 1½ miles above the intake. The drainage from this barn and manure pile pass readily into the brook.

2. At a farmhouse about 2½ miles above the intake a privy in fair condition is located about 50 feet from the brook, while the barn and manure pile, about 25 feet from the brook, are in a very insanitary condition.

3. The Hinman Hollow school, in the town of Hartwick, is about 3 miles above the intake. Here there are two school privies in a very unsatisfactory condition about 25 feet from the brook, and in the rear

of one of the residences near the school there is a privy in a very bad condition, within 10 feet of the brook. There are also sources of possible pollution from other houses upon the watershed. These are in general, however, further removed from the creek. Pollution is also caused by the cattle pasturing upon the watershed.

At the time of the inspection a sample of the water was obtained from a tap in the village and analysis of this sample together with those made previously by the Division of Laboratories and Research will be found in the appended table.

From the results of these analyses it will be seen that the water usually contains considerable color and turbidity derived from the organic matter on the watershed and surface wash. The water is moderately soft and the figures for nitrogen in its various forms show considerable variation due apparently to the varying amount of pollution received at the different seasons of the year. The oxygen consumed results and also the chlorine results indicate pollution at various times. In the bacterial results high counts of bacteria are usually found and organisms of the B. coli group have always been found in 10 c.c. inoculations, more than half of the time in 1 c.c. inoculations and occasionally in 1/10 c.c. inoculations, such results plainly showing the seriousness of the pollution.

As a result of this investigation and of the analyses, the following conclusions may be drawn:

1. That the water supply of the village of Milford in its present condition is not satisfactory from a sanitary standpoint, due to the numerous opportunities for pollution from the various privies and barnyard located near the brook and to the pasturing of cattle upon the watershed.

In view of the above conclusion, I would make the following recommendations:

1. That the village authorities consider at once the possibility of securing a new supply of water from a source free from any possibility of contamination.
2. That, if this is not found practicable, the village authorities, under competent engineering advice, install a filter plant and sterilization apparatus for the adequate purification of all water from the present source.
3. That, in case it is decided to continue the present supply with filtration and sterilization, the village authorities make an inspection of the watershed in order to correct as far as possible those conditions which now constitute sources of pollution. If this cannot be accomplished readily, the board of trustees should apply to this Department for the enactment of rules and regulations for the protection of the watershed.

In conclusion, I would further recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 24, 1917

REPORT OF WATER ANALYSES FOR MILFORD

Source	Tap in village	Tap in village	Tap in village	Tap in village	Tap in village	Tap in village
Collected on	2/15/11	5/3/11	7/26/11	10/11/11	12/20/11	2/2/12
Color	10	10	30	10	5	10
Odor, hot	.....	.....	.....	.....	.....	.....
Odor, cold	.....	.....	.....	.....	.....	.....
Turbidity	10	40	15	5	2	15
Solids, total	62	77	70	65	60	85
Loss on ignition	.....	.....	.....	.....	.....	.....
Mineral residue	43	60	49	40	46	50
Ammonia, free	.010	.034	.010	.020	.034	.016
Ammonia, albuminoid	.062	.146	.056	.076	.086	.052
Nitrates	.001	.002	.002	.001	.001	Tr.
Nitrites	0.40	0.20	0.20	0.06	0.40	0.48
Oxygen consumed	1.50	5.40	2.30	2.00	1.60	1.90
Chlorine	1.25	1.75	0.63	0.75	1.00	1.25
Hardness, total	29.9	26.0	41.6	29.9	33.8	28.6
Alkalinity	25.0	20.0	37.0	29.0	17.0	26.0
Bacteria per c.c.	375	3,100	3,500	100	450	180
B. coli type 10 c.c.	+	+	+	+	+	+
B. coli type 1 c.c.	—	+	+	—	—	+
B. coli type 1/10 c.c.	—	+	+	—	—	—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

REPORT OF WATER ANALYSES FOR MILFORD

Source	Tap in village	Tap in village	Tap in village
Collected on	4/13/12	11/15/12	11/23/16
Color	15	15	5
Odor, hot	.....	.....	.....
Odor, cold	.....	.....	.....
Turbidity	10	10	5
Solids, total	34	55	.....
Loss on ignition	.....	.....	.....
Mineral residue	17	41	.....
Ammonia, free	.004	.010	.002
Ammonia, albuminoid	.086	.080	.044
Nitrates	0.26	0.36	0.16
Nitrites	Tr.	Tr.	.001
Oxygen consumed	2.60	3.20	1.30
Chlorine	0.75	1.00	0.75
Hardness, total	20.8	35.1	45.7
Alkalinity	13.0	21.0	25.0
Bacteria per c.c.	190	900	275
B. coli type 10 c.c.	+	+	3+0—
B. coli type 1 c.c.	+	+	0+3—
B. coli type 1/10 c.c.	—	—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

MILLERTON

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Millerton made by Mr. C. M. Baker, assistant engineer, on January 18, 1917.

Millerton is an incorporated village of 890 inhabitants located in Dutchess county on the Harlem division of the New York Central railroad about 60 miles south of Albany. No sewer system is provided in the village, the houses being served by privies, cesspools, etc.

The water supply is controlled by the municipality and is derived from a spring at the head of a small brook about 1 mile west of the village, from the brook itself, and also from a well located in the western edge of the village. The water flows from the spring and the brook to a small impounding reservoir, whence it flows by gravity to the village. The well supply is pumped directly into the distribution system. About 90 per cent of the population is served with the water, there being in all some 300 service taps, only 13 of which are metered. There are about 3 miles of mains ranging in size from 4 to 8 inches in diameter. The water consumption is estimated to be about 105,000 gallons daily during the winter and 125,000 gallons per day during the summer. The pressure in the village averages about 95 pounds per square inch.

The spring is located in the bed of the stream near the head of the brook and is protected by means of concrete walls above and below it and perpendicular to the course of the stream also by a concrete channel which passes directly over it to carry the brook water at times of freshet. There was no water in the brook above the spring, however, at the time of the inspection. From the spring the water is connected by tile pipe into the small impounding reservoir located about 1,000 feet below. It is said that during storm the spring water remains clear. Just above the reservoir is a small concrete intake basin protected by a half-inch mesh screen. A 3-inch pipe discharges from this intake through a funnel into a cast-iron pipe which in turn discharges into the reservoir. An embankment or dam diverts the main flow of the stream from its natural channel around the reservoir; furthermore, the 3-inch pipe may be plugged in case of storm so that all of the brook water may be diverted. It should be pointed out, however, that to close this pipe a man from the village, about half a mile distant, must visit the intake. It is probable therefore that the brook water is not always shut off in case of storm. The reservoir is formed by a small dam across the natural channel of the brook and has a capacity of about 300,000 gallons, or about 3 days' consumption.

The well is located on a flat near the railroad just northwest of the village. The upper portion of it is 10 by 18 feet in plan by 12 or 14 feet deep. In the bottom of this basin some 8 or 10 small wells are drilled to a total depth of 20 or 22 feet. The strata consist of gravel to a depth of 18 or 20 feet, then about 18 inches of clay, below which lies a water-bearing gravel, which is the principal source of supply. From this well the water is pumped into the distribution system, the pumping equipment consisting of a 20 and a 25 horsepower motor, 1 Demming pump with a capacity of 240 gallons per minute and a Gould pump with a capacity of 208 gallons per minute.

The area of the watershed tributary to the brook supply is 40 or 50 acres. It is uninhabited and is used principally for pasture land. Several acres of land in the vicinity of the spring and reservoir are owned by the village and are enclosed by a fence. The spring, however, is at the upper edge of this area, the fence being only about 10 feet distant. Beyond the fence and above is pasture land. The supply undoubtedly receives pollution from pasture land, although no sources of pollution of human origin were apparent. The spring, while fairly well protected from surface wash, may at times receive pollution, due to the rapid infiltration of surface water through the gravel forming the bed of the stream.

Within about 50 feet of the well is the railroad, just beyond which is located a small roundhouse operated in connection with the Newburgh, Dutchess and Connecticut railroad. The general sanitary conditions in the immediate vicinity of the well, however, were satisfactory at the time of the inspection.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water usually satisfactory in physical qualities with respect to color and turbidity but a water that is very hard. The figures for nitrogen in the form of free and albuminoid ammonia are

moderate. Those for nitrates and chlorine, however, appear to be above normal, thus indicating that pollution finds its way into the supply. The bacterial counts are at times very high and colon bacilli are prevalent in the 10 c.c. inoculations and occasionally present in 1 c.c. inoculations of samples collected from taps in the village, thus indicating the presence of active contamination. Colon bacilli were also found present in 10 c.c. and 1 c.c. inoculations of the well water collected at the time of this inspection.

As a result of this investigation, it may be concluded:

1. That the Millerton water supply is subject to some pollution due to surface wash which finds its way into the storage reservoir from pasture land.
2. That although recent analyses indicate the presence of active contamination of the well supply, the sanitary surroundings appeared to be satisfactory at the time of the inspection, and it is possible, therefore, that this pollution is due to some local contamination due to repairs on the pumps which had been made a short time prior to the inspection.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That regarding the brook and spring supply:
   (a) The village purchase or secure control of additional land in the vicinity of the stream above the spring.
   (b) Consideration be given to the development of an automatic device for diverting all of the brook supply in case of storm.
2. That sanitary conditions in the vicinity of the well be at all times carefully maintained and that analyses of this water be made occasionally during the year to detect any active contamination which may occur and thus determine whether the contamination indicated by the analyses in connection with this investigation is temporary or of a permanent character.

In conclusion, I would recommend that copies of this report be sent to the village officials and the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 8, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Millerton	Dutchess	Tap, public cupply	1/17/10	Tr.	Cl.			166		158	.046	.022	.003	0.20	1.00	1.75	131.4	123.0	450	—	—	—
Millerton	Dutchess	Tap, public supply	9/ 7/10	Tr.	Cl.			180		142	.012	.012	.001	0.40	0.10	1.75	140.0	109.0	6,500	+	+	—
Millerton	Dutchess	Tap, public supply	2/24/11	Tr.	Cl.			235		163	.030	.030	.020	0.60	0.50	2.75	160.0	155.0	1,100	—	+	—
Millerton	Dutchess	Tap, public supply	5/ 9/11	0	Cl.			128		112	.028	.066	.004	0.30	0.40	2.25	111.4	110.0	190	—	—	—
Millerton	Dutchess	Tap, public supply	6/21/11	2	Cl.			152		134	.008	.020	.002	0.20	1.00	2.25	131.4	131.0	100	—	—	—
Millerton	Dutchess	Tap, public supply	9/25/11	Tr.	Cl.			186		165	.004	.020	Tr.	0.10	0.70	3.00	154.2	139.0	350	+	—	—
Millerton	Dutchess	Tap, public supply	11/ 8/11	Tr.	Cl.			146		112	.004	.014	.001	0.40	0.60	2.25	114.2	112.0	600	+	—	—
Millerton	Dutchess	Tap, public supply	1/20/12	Tr.	Cl.			131		109	.006	.014	.001	0.28	0.20	1.87	114.2	110.0	80	+	—	—
Millerton	Dutchess	Tap, public supply	2/27/12	8	12			122		106	.010	.050	.001	0.36	1.10	1.25	75.7	63.0	4,900	+	+	—
Millerton	Dutchess	Tap, public supply	3/29/12	Tr.	Cl.			119		104	.006	.008	.001	0.70	0.30	1.75	98.6	86.0	90	—	—	—
Millerton	Dutchess	Tap, public supply	5/21/12	Tr.	Cl.			129		112	.002	.008	.001	0.50	0.10	1.75	111.4	110.0	30	+	—	—
Millerton	Dutchess	Tap, public supply	8/30/12	Tr.	Cl.			237		204	.002	.002	.001	0.52	0.20	1.50	142.8	142.0	40	+	—	—
Millerton	Dutchess	Tap, public supply	10/18/12	Tr.	Cl.			221		178	.004	.006	Tr.	1.00	0.30	3.25	174.2	123.0	60	—	—	—
Millerton	Dutchess	Tap, public supply	12/21/12	Tr.	Cl.			141		121	.014	.034	.001	0.70	1.20	1.75	111.4	103.0	200	—	—	—
Millerton	Dutchess	Tap, public supply	1/24/13	Tr.	Cl.			114			.012	.024	Tr.	0.70	0.40	2.00	105.8	96.0	30	—	—	—
Millerton	Dutchess	Tap, public supply	2/28/13	Tr.	Cl.			114			.010	.024	Tr.	0.50	0.40	1.75	93.6	98.0	400	+	—	—
Millerton	Dutchess	Tap, public supply	4/11/13	Tr.	Cl.			115			.010	.032	.001	0.40	0.50	1.50	100.0	95.0	10	—	—	—
Millerton	Dutchess	Tap, public supply	5/22/13	Tr.	Cl.			151			.010	.038	.001	0.22	0.90	1.25	114.2	108.0	650	+	—	—
Millerton	Dutchess	Tap, public supply	7/ 1/13	Tr.	Cl.			201			.004	.002	.001	0.70	0.20	2.75	145.8	135.0	20	—	—	—
Millerton	Dutchess	Spring supply	1/18/17																25	0+3—	0+3—	0+3—
Millerton	Dutchess	Brook, below spring	1/18/17	Tr.	Cl.	1 v.	1 v.	154	13	141	.008	.023	.002	0.64	1.30	1.00	137.2	117.0	300	3+0—	0+3—	0+3—
Millerton	Dutchess	Well supply	1/18/17	Tr.	Cl.	1 v.	1 v.	192	50	142	.014	.004	.002	0.64	1.10	3.50	94.3	76.0	35	3+0—	1+2—	0+3—

MOHAWK

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Mohawk made by Mr. C. M. Baker, assistant engineer, on October 27, 1916.

Mohawk is an incorporated village of about 2,600 inhabitants located in Herkimer county on the south bank of the Mohawk river. It is on the West Shore railroad about 12 miles east of Utica. The village may also be reached by the New York Central line via Herkimer, trolley accommodations being provided between the two villages. Mohawk is the center of an industrious manufacturing center. The village is provided with a system of sewers which discharges without treatment into the Mohawk river.

The water supply is owned by the village and was first put into operation in 1895. It is derived from a covered dug well located at the northeastern edge of the village between the Erie canal and the West Shore railroad. From the well the water is pumped through the distribution system into a standpipe located in a hill just east of the village. About 90 per cent of the population is served with the water, there being in all about 600 service taps, one-third of which are metered. The pressure in the village averages about 75 pounds per square inch. Six and one-half miles of 4 to 8-inch cast-iron pipe constitute the distribution system. The water consumption averages about 300,000 gallons daily with a maximum of possibly 375,000 gallons, which corresponds to per capita rates of 120 and 150 gallons respectively.

The pumping equipment is housed in a brick building located near the well and consists of two 800,000-gallon motor-driven Rumsey pumps and one 45,000-gallon Dean steam pump. The standpipe is constructed of steel, is 18 feet in diameter by 50 feet high and has a capacity of approximately 95,000 gallons, which is equivalent to 7 or 8 hours' consumption.

The well from which the supply is derived, as stated above, is located between the West Shore railroad and the Erie canal, being about 50 feet from the former and 200 feet from the latter. It is 12 feet in diameter and is dug through 14 feet of sand and gravel, the walls being of masonry and the roof of wood. The water of the canal is at a higher elevation than that of the well, possibly 6 or 8 feet, and is 3 or 4 feet higher than the ground about the well. No insanitary conditions were observed in the vicinity at the time of the inspection, the nearest house being across the canal 400 or 500 feet distant. Beyond 500 feet and within 1,000 feet of the well there are approximately 40 houses.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but a water that is very hard. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low, but for nitrates and chlorine appear to be above normal, thus indicating that pollution finds its way into the ground water tributary to the supply. The low bacterial counts, however, and the absence of colon bacilli indicate that this pollution is rendered inactive by the natural processes of purification.

As a result of this investigation, it may be concluded that the water supply of Mohawk is derived from a source which should furnish water of satisfactory quality if the wells are at all times adequately protected from pollution.

In view of the above, it seems necessary to recommend at this time only that the village authorities continue their careful supervision of the supply in order to prevent the possibility of pollution finding its way into the water at any time.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 25, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Mohawk	Herkimer	Tap, public supply	2/ 3/12	Tr.	Cl.			275		254	.020	.016	.001	0.34	0.10	3.50	162.5	148.0	10	−	−	−
Mohawk	Herkimer	Tap, public supply	4/29/12	Tr.	Cl.			233		218	.005	.022	.001	0.48	0.10	3.25	148.6	147.0	4	−	−	−
Mohawk	Herkimer	Tap, public supply	6/20/12	2	2			210		179	.004	.004	.001	0.64	0.13	3.50	168.6	142.0	215	−	−	−
Mohawk	Herkimer	Tap, public supply	9/12/12																23	−	−	−
Mohawk	Herkimer	Tap, public supply	11/30/12	Tr.	Cl.			195		180	.008	.018	Tr.	0.34	1.60	3.50	165.8	146.0	30	−	−	−
Mohawk	Herkimer	Tap, public supply	1/16/13	Tr.	Cl.			196			.014	.004	.001	0.40	0.70	4.00	154.2	143.0	1	−	−	−
Mohawk	Herkimer	Tap, public supply	2/21/13	Tr.	Cl.			206			.028	.042	Tr.	0.36	0.70	3.75	160.0	148.0	20	−	−	−
Mohawk	Herkimer	Tap, public supply	3/27/13	Tr.	Cl.			206			.012	.016	Tr.	0.46	0.30	3.50	160.0	145.0	20	−	−	−
Mohawk	Herkimer	Tap, public supply	5/ 8/13																230	−	−	−
Mohawk	Herkimer	Tap, public supply	6/12/13	Tr.	Cl.			222			.004	.006	Tr.	0.16	0.30	3.50	140.0	138.0	50	−	−	−
Mohawk	Herkimer	Tap, public supply	5/ 6/14	Tr.	Cl.			213		187	.010	.024	Tr.	0.50	0.20	3.50	145.8	141.0	18	−	−	−
Mohawk	Herkimer	Tap, public supply	10/27/16	Tr.	Cl.	1 v.	1 v.				.010	Tr.	.001	0.50	0.60	3.13	165.8	140.0	5	0+3−	0+3−	0+3−

MONTOUR FALLS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Montour Falls made by Mr. C. M. Baker, assistant engineer, on May 29, 1917.

Montour Falls is an incorporated village of 1281 inhabitants, located in Schuyler county, on Catherine creek, the inlet to Seneca lake. The village is on the North Central railroad, and may also be reached by trolley from Elmira. It is three miles south of Watkins and 19 miles north of Elmira. No sewer system is provided, the houses being served by privies, cesspools, etc. There are, however, a few drains to carry off surface water from the streets.

The water supply was installed about 1898, and is derived from an impounding reservoir on Johns brook at a point about 2 miles northeast of the village. From this reservoir the water flows by gravity through the distribution system. About 50 per cent of the population is served with the water. It was stated, however, that although the water is used by some for drinking and potable purposes it is principally used for sprinkling and flushing purposes, the water for drinking and domestic purposes being obtained mostly from private wells. There are in all 130 or 135 service taps, none of which are metered. The distribution system consists of 7 or 8 miles of mains ranging in size from 8 to 10 inches in diameter. Due to the lack of meters or other method of measuring the water used no defiinte information could be obtained regarding the consumption, but based upon a per capita rate of 100 gallons daily, the total consumption would be approximately 65,000 gallons per day. The reservoir is located about 400 feet higher in elevation than the city. Pressure reducing valves, however, reduce the pressure to about 85 pounds per square inch in the distribution system. A connection is also provided whereby water can also be turned into the system from another creek located south of Johns creek, as an auxiliary supply should occasion demand.

The reservoir is formed by a concrete dam constructed across a narrow gorge in the creek. It is roughly 300 feet wide by 400 feet long and has a capacity estimated at about 10,000,000 gallons, which is equivalent to about 154 days storage when based upon the consumption stated above, but is considerably less when based upon the stream flow. The intake consists of a screened pipe extending into the reservoir.

The private wells of the village from which the water for domestic purposes is principally obtained are said to be somewhat artesian in character, some of them being flowing wells. The strata consist of 6 to 8 feet of gravel, several feet of a continuous clay stratum and finally a water bearing gravel stratum, from which the supply is obtained. The wells are 40 to 60 feet deep. Cesspools are sunk into the first stratum of gravel, but do not penetrate the clay stratum.

The watershed tributary to the reservoir is about 3.68 square miles in area and has a total population of approximately 150 persons, or 41 per square mile. Topographically the area is very precipitous, a large portion is wooded, the remainder being used for farming and agricultural purposes. There are in all some 30 farms on the watershed. The buildings, however, are located well back from the streams. There appears to be little possibility of direct pollution except accidental, incidental or wilful pollution from the inhabitants or trespassers on the watershed.

Due to lack of containers samples of the water were not collected at the time of the inspection. Later, however, the local health officer collected samples and sent them to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water at times high in color and turbidity, also a water that is somewhat high in hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are moder-

ate. Those for nitrates and chlorine, however, are somewhat high, thus indicating that pollution at times finds it way into the supply. The bacterial counts are at times excessive and colon bacilli were found present in practically all of the 10 c.c. inoculations and occasionally in the 1 c.c. inoculations, thus indicating the presence of active and potentially dangerous contamination.

As a result of this investigation it may be concluded:

1. That the water supply of Montour Falls is obtained from a source which is subject to considerable pollution from inhabitants on the watershed tributary to the supply.
2. That, although the supply is not used by all for domestic purposes, it is so used to a considerable extent.
3. That, although the private well supplies from which water is generally obtained for domestic purposes, may in most cases furnish water satisfactory in quality it is quite probable that pollution at times finds its way into some of them from cesspools, etc., by seepage along the pipes of the wells.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That consideration be given as soon as possible to the installation of a modern purification plant for treating the public water supply.
2. That pending the installation of the complete purification plant apparatus be installed and the water be sterilized with liquid chlorine.

While it is possible that the private wells of the village are used to furnish much of the water for potable purposes, it has been the experience of this Department that, where running water is available in the houses, the latter water is used to a considerable extent for drinking and other domestic purposes. Furthermore, experience has shown that wells located in a thickly populated district, as in Montour Falls, sooner or later become contaminated. This is particularly true where no sewers are provided and where a large amount of sewage is discharged into the ground through leaching cesspools. We believe, therefore, that the matter of proper purification of the public water supply so as to render it safe and satisfactory for potable purposes is of vital importance to the health of the village. The above recommendations should, therefore, have the careful consideration of the various village officials.

Finally, I would recommend that copies of this report be sent to the local health officer and board of trustees, also to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *July* 19, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Montour Falls	Schuyler	Tap, public supply	1/10/12	5	Tr.			125		96	.034	.034	.006	0.90	1.10	2.25	64.3	63.0	100	+	−	−
Montour Falls	Schuyler	Tap, public supply	2/13/12	20	5			137		112	.056	.056	008	0.80	1.35	3.75	87.2	80.0	200	+	+	−
Montour Falls	Schuyler	Tap, public supply	3/21/12	35	100			95		72	.014	.200	.002	0.50	9.20	1.50	58.6	21.0	1,900	+	−	+
Montour Falls	Schuyler	Tap, public supply	4/24/12	15	5			91		78	.006	.070	.001	1.20	2.20	2.00	61.4	10.0	2,000	+	+	−
Montour Falls	Schuyler	Tap, public supply	10/ 8/12	10	Cl.			95		81	.004	.052	.001	0.38	2.10	1.25	64.3	60.0	47,500	+	+	−
Montour Falls	Schuyler	Tap, public supply	11/27/12	15	Cl.			148		122	.028	.070	.001	0.34	1.90	1.50	87.1	77.0	2,000	+	+	−
Montour Falls	Schuyler	Tap, public supply	1/ 2/13	15	Cl.			113			.032	.060	.004	0.60	1.60	3.00	71.4	69.0	170	+	+	−
Montour Falls	Schuyler	Tap, public supply	2/20/13	10	2			118			.024	.050	.001	0.72	2.25	2.10	74.3	68.0	2,100	+	+	−
Montour Falls	Schuyler	Tap, public supply	3/24/13	30	10			106			.034	.110	.003	0.80	2.10	2.75	58.6	46.0	17,500	−	−	−
Montour Falls	Schuyler	Tap, public supply	5/ 5/13	15	10			104			.014	.066	.001	0.50	2.00	2.00	62.9	54.0	.....	+	+	−
Montour Falls	Schuyler	Tap, public supply	6/25/13	12	20			195			.118	.188	.001	0.08	2.80	3.25	122.8	118.0	500	+	−	−
Montour Falls	Schuyler	Tap, public supply	6/28/17	15	75	1 e.	2 e.				.270	.224	.010	0.50	6.00	1.00	55.7	65.0	2,600	+	+	+

MORRISVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Morrisville, made by Mr. C. M. Baker, assistant engineer, on April 11, 1917.

Morrisville is an incorporated village of 582 inhabitants, located in Madison county, about 25 miles southwest of Utica, and some three miles west of Morrisville station, on the Oswego branch of the Ontario and Western railroad. Sewage disposal is provided principally by privies and cesspools, although there are some private sewers, which discharge without treatment into a small brook that runs through the village.

The public water supply is derived from an impounding reservoir, fed principally by springs and located about ¾ mile west of the village. The water supply is owned and operated by the municipality and was first put into operation in 1895. Practically the only improvement since this time has consisted of the raising of the elevation of the dam and improving the watershed in the immediate vicinity of the reservoir. From the reservoir the water flows by gravity through the distribution system. Practically all of the population is served with the water, there being in all about 150 service taps, all of which are metered except a few public taps and four water motors, each of which is connected with a 1½-inch tap. There are in all about 2½ miles of mains, ranging from 4 inches to 10 inches in diameter. The pressure in the center of the village averages about 86 pounds per square inch.

The reservoir is formed by the construction of an earthen dam with clay puddle and originally had a capacity of about 7,000,000 gallons, but now since the raising of the elevation of the dam, its capacity is 16,000,000 gallons. The intake consists of a 10-inch pipe which extends about 40 feet into the reservoir and is supported by a rubble pier and protected by a screen. A screen chamber is also provided just below the dam which is fitted with removable screens for the purpose of removing any large material that may find its way through the intake.

The watershed tributary to the reservoir has an area of only 50 or 60 acres and is used mostly as a meadow, there being no resident population. Although two roads cross the watershed, one is seldom used and the reservoir is protected from drainage from the other by means of ditches, which were clean and in good condition at the time of the inspection. A large portion of the watershed in the immediate vicinity of the reservoir is owned by the village and is enclosed by a fence. Most of this area has been reforested.

Some trouble has been experienced during the summer in the past, due to tastes and odors in the water. This trouble is said to be caused by a growth in the reservoir, which begins about the first of July and lasts through the summer. Samples of this vegetable growth were sent to the United States Department of Agriculture by the village officials for analyses. In its reply the Federal Department stated that "the growth responsible for the trouble is a plant which is quite resistant to the action of chemicals, and I regret, therefore, that it is not feasible to recommend any chemical treatment for avoiding this trouble." It was suggested, however, that the reservoir be covered or that the water be filtered and aerated. Samples of this growth were not available at the time of the inspection and detailed information regarding the trouble could not then be obtained.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of a previous analysis are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity and one moderate in hardness. The figures for nitrogen in its various forms are low and although the bacterial counts in these samples recently collected were high, colon bacilli were not found present in the inoculations tested.

As a result of this investigation, it may be concluded:

1. That the water supply of Morrisville, although derived from a source which may at times be subject to pollution by surface wash from roads, is nevertheless, comparatively well protected from this pollution by drainage ditches and by the careful supervision of the supply exercised by the village authorities.

2. That some trouble has been experienced with tastes and odors in the water during the summer, due apparently to a vegetable growth.

In view of the above, I beg to recommend:

1. That the village authorities continue their careful supervision of the sanitary conditions on the watershed, in order to prevent pollution of the supply.

2. That the village authorities have a careful study made of the conditions causing the disagreeable tastes and odors during the summer when they exist and that means of obviating these unsatisfactory conditions be devised and put into operation.

In conclusion I would recommend that copies of this report be sent to the village board, to the local health officer, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June 7*, 1917

REPORT OF WATER ANALYSES FOR MORRISVILLE

SOURCE	Tap	Reservoir	Tap
Collected on	10/15/14	4/13/17	4/13/17
Color	5	.....	6.0
Odor, hot	.....	.....	1 v.
Odor, cold	.....	.....	1 e.
Turbidity	3	.....	2.0
Solids, total	62	.....	52.0
Loss on ignition	17	.....	17.0
Mineral residue	45	.....	35.0
Ammonia, free	.002	.....	.008
Ammonia, albuminoid	.076	.....	.051
Nitrites	.001	.....	.002
Nitrates	0.02	.....	.04
Oxygen consumed	3.30	.....	3.10
Chlorine	1.25	.....	1.25
Hardness, total	36.4	.....	31.2
Alkalinity	32.0	.....	31.0
Bacteria per c.c.	20	1,160	500
B. coli type — 10 c.c.	.....	0+3—	0+3—
B. coli type — 1 c.c.	.....	0+3—	0+3—
B. coli type — 1/10 c.c.	.....	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

MOUNT KISCO

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the public water supply of the village of Mount Kisco, Westchester county. An investigation of this supply was made on December 29, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Mr. G. E. Ganun, superintendent and Dr. G. P. M. Curry, health officer of the village.

Mount Kisco is an incorporated village in the northcentral part of Westchester county, and about 30 miles north of New York city, and 8 miles east of the Hudson river. It is in the southern part of the watershed of Croton lake, and is on the Harlem division of the N. Y. C. & H. R. R. The population at the time of the inspection was estimated at about 3,000.

Practically all of the village is served by a sewer system constructed by the village and a sewage disposal plant built by the city of New York to protect its water supply.

The water supply is obtained from Byram lake, about 5 miles southeast of the village, and from two reservoirs on a small brook about 4 miles southeast of the village. Water from the lake is pumped to the lower reservoir on the brook and the mixed waters flow by gravity from this reservoir to the village. About 95 per cent of the population are served by the pulbic water supply. The average daily consumption as obtained from the meter readings of the houses is about 123,000 gallons, while the consumption as estimated from the pumping records is about 190,000 gallons per day. There are about 12 miles of water mains varying from 4 to 10 inches in diameter. About 500 of the 550 houses in the village are served by this supply and all of the services are metered. The average pressure in the village is about 100 pounds per square inch, and there are about 75 hydrants in various parts of the village for fire protection.

That portion of the water supply system which has been in use for some time was designed by Mr. E. D. Smalley, civil engineer, while that portion now taken from the lake was designed by Mr. B. F. Darling, civil engineer. The old works were constructed in 1898, while the new portion was constructed during 1914 and 1915.

The reservoirs are open and formed by the construction of dams across the brook. The upper reservoir is about 90 feet by 170 feet in plan, has an average depth of about 11 feet, and a capacity of about 500,000 gallons. The lower reservoir is about 160 by 235 feet in plan, 12 feet deep, and has a capacity of about 2,000,000 gallons. The reservoirs are said to be cleaned out about every 5 years, and the street mains are flushed through the hydrants every three months during the summer.

An auxiliary supply from Kisco river was formerly in use, the intake being a short distance southeast of the village. This supply has now been abandoned and the pumping machinery formerly located at this point has been removed to the new pumping station at Byram lake.

The lake water is taken from a point about 150 feet from the shore and about 22 feet deep in the northwestern portion of the lake. The village is obliged to pay the city of New York for all water taken from the lake, on account of the lake being a portion of the water supply of New York city.

The pumping station located on the shore of the lake has concrete walls and floor and a frame roof, and is 24 by 30 feet in plan. The pumping equipment consists of one General Electric 20 h. p. motor, operating a Rumsey & Company triplex, single action plunger, 5 inches by 8 inches pump and one General Electric 20 h. p, motor, operating a Rumsey & Company triplex, single action plunger, 8-inch by 10-inch pump. These pumps are operated as required by the superintendent.

Byram lake has a watershed of about 1½ square miles, and the brook has a watershed of about .15 of a square mile. There are 10 or 11 houses upon these two watersheds, having a total population of about 50. This gives a

population per square mile of about 30. Many of the houses upon the watershed are closed during the winter months. The watersheds are hilly and well forested. There is a small amount of swamp land upon one or two of the brooks tributary to the lake.

The watersheds, tributary to the Mount Kisco water supply, are also watersheds of the New York city supply, and are protected by rules and regulations enacted for the protection of the New York city supply. The watersheds are frequently patrolled by inspectors from the department of water supply, gas and electricity, and sanitary conditions were found to be in an excellent condition.

At the time of the inspection samples of the water were obtained from the lake supply, from the brook supply and from a tap in the village, and analyses of these samples will be found in the appended table. Analyses made previously by the Division of Laboratories and Research are not included in this report, since many of them were of samples taken from the old Kisco creek supply, which has since been adandoned.

From the results of these analyses it will be seen that the tap water is practically clear, although slightly colored. The color is undoubtedly due to the swamp land on the watershed. The water is comparatively soft. Nitrogen in its various forms is comparatively low with the exception of that found in the form of albuminoid ammonia. The presence of albuminoid ammonia is in all probability largely due to organic matter from the swamp land. The figures for chlorine are about normal for this section of the State.

The bacterial content of the brook water was very high and organisms of the B. coli group were found in 3 of the 10 c.c. inoculations and in one of the 1 c.c. inoculations. This high bacterial content as well as the presence of B. coli are probably due to the influence of surface drainage from pasture land and to the cultivation carried on upon the watershed. The sample from the lake had a small bacterial count and no organisms of the B. coli group were present in the samples inoculated. The sample from the tap in the village which is probably a composite sample of water from both sources, gave a moderate count of bacteria and showed organisms of the B. coli group in one of the 10 c.c. samples.

As a result of this investigation and of the analyses the following conclusions may be drawn:

1. That the water supply of Mount Kisco, although of a reasonably satisfactory physical quality, is subject to a certain amount of contamination of animal origin from pasture land upon the tributary watersheds.
2. That in general the watersheds are probably maintained in as satisfactory sanitary condition as is possible for a populated and accessible area, due to the enforcement of the rules and regulations protecting the water supply of New York city.

In view of the above conclusions, I would recommend that, on account of the ever present possibility of accidental, incidental or wilful contamination, the village consider the advisability of installing a satisfactory sterilization apparatus.

I would further recommend that copies of this report be transmitted to the village authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 30, 1917

REPORT OF WATER ANALYSES FOR MT. KISCO, N. Y.

Source	Mt. Kisco Brook marked "A"	Tap at pump station Lake supply No. B	Tap in village marked "C"
Collected on	12/29/16	12/29/16	12/29/16
Color	.....	.....	5
Odor, hot	.....	.....	2 v.
Odor, cold	.....	.....	2 v.
Turbidity	.....	.....	tr.
Solids, total	.....	.....	.....
Loss on ignition	.....	.....	.....
Mineral residue	.....	.....	.....
Ammonia, free	.....	.....	.014
Ammonia, albuminoid	.....	.....	.150
Nitrites	.....	.....	.001
Nitrates	.....	.....	0.20
Oxygen consumed	.....	.....	1.70
Chlorine	.....	.....	3.50
Hardness, total	.....	.....	28.60
Alkalinity	.....	.....	21.0
Bacteria per c.c.	1,300	25	45
B. coli type, 10 c.c.	3+0—	0+3—	1+2—
B. coli type, 1 c.c.	1+2—	0+3—	0+3—
B. coli type, 1/10 c.c.	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

MOUNT MORRIS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of the village of Mount Morris, made on January 10, 1917, by Mr. E. S. Chase, assistant engineer in this Department.

Mount Morris is an incorporated village with a population of 3,884, located in the western part of Livingston county, on the D. L. & W., Erie and Pennsylvania railroads, about 40 miles southwest of Rochester. The village is in the center of a farming section and contains a large canning industry. There is a public system of sewers with a disposal plant consisting of an Imhoff tank.

The public water supply is derived from Silver lake after filtration through pressure mechanical filters. The waterworks are owned and operated by the municipality, under the direction of the board of water commissioners, of which Mr. Charles Stiles is president, and Mr. C. F. Braman is superintendent. The waterworks were first put in operation in the fall of 1915. The system was designed by Witmer & Company of Buffalo, and constructed by contract, under their direction

Prior to the installation of the new and municipally owned supply the village was supplied by the Mills Water Works Company. This supply became somewhat inadequate for the needs of the village, and upon the expiration of the franchise the village took the steps necessary to secure the supply which has now been installed. The supply of the Mills Water Works Company was obtained from a number of springs and a system of tile collecting drains located in a small valley immediately northwest of the village. From these springs and collecting tile the water flowed by gravity to a small distributing reservoir and thence to the village. With the installation of the new works the majority of consumers discontinued the use of the private supply, and at the time of the inspection not more than 70 service taps remained connected with it. Subsequent to the time of the inspection information was received from Dr. Leach, the local health officer, that the supply from these springs was insufficient to supply even these few remaining customers, and that the water company's mains had been connected with the village system.

The intake for the new supply at Silver lake is located about 9 miles west of Mount Morris. From this intake the water flows by gravity through about 8½ miles of conduit to pressure filters and a distributing reservoir located in the western part of the village. The pressure in the village ranges between 80 and 90 pounds per square inch. At the time of the inspection there were 380 service taps, of which only 3 or 4 were metered. Additional service connections are being added from time to time. The daily water consumption is unknown, for although 375,000 gallons a day are received at the filter house a large proportion of this is run to waste. In summer, however, when the canning factories are in operation the daily consumption probably approximates 375,000 gallons. Under the terms of the Conservation Commission's decision the amount of diversion of the water from Silver lake for the purposes of this water supply has been limited to 500,000 gallons per day, the amount diverted being measured by a meter installed in the village of Perry.

The intake at Silver lake consists of 300 feet of 8 and 10-inch pipe, extending into the lake at its northeasterly end. This intake pipe terminates in an upturned vertical strainer.

The filtration plant consists of two New York Continental Jewell pressure filters 8 feet in diameter by 12 feet long and with a daily capacity of 250,000 gallons each. Alum is applied to the raw water as it enters the filters by means of the shunt system. The alum is applied at the rate of about ½ grain per gallon. The filters are cleaned in the usual manner by reversing the direction of flow and after washing the first filtrate is wasted for 1½ minutes. Apparatus, consisting of solution tanks, constant head orifice boxes and a small injector pump, is also provided for applying a solution of hypochlorite of lime to the filtered water. The rate of application is automatically controlled and varies with the amount of water treated. At the time of the inspection no hypochlorite was being applied as the injector pump was out of service for repairs.

After filtration the water passes to an open circular concrete reservoir 80 feet in diameter by 14 feet deep and with a capacity of 500,000 gallons. This reservoir is divided into two compartments by a division wall to facilitate cleaning.

The general conditions affecting the sanitary quality of the raw water from Silver lake have been described in detail in the report of this Department upon the public water supply of the village of Perry, which derives its supply from the same source, this report being published on page 678 of the 34th annual report of this Department. In this report it is pointed out that the waters of Silver lake are subject to more or less pollution from the population occupying the residences on the easterly shores of the lake during the summer season, and that the water supply derived therefrom should be subject to some method of purification.

At the time of the recent inspection samples of raw and filtered water were collected and the results of the analyses of these samples, together with others made in the past by the Division of Laboratories and Research will be found in the appended table.

These analyses show that although the raw water is of a fairly good quality it is at times subject to contamination. All samples of filtered water have shown reasonably low bacterial counts and the absence of organisms of the B. coli type. Although somewhat hard the filtered water is of a fairly satisfactory physical quality.

In view of the above facts the following conclusions may be drawn:

1. That the present public water supply of the village of Mount Morris, if the filter plant is at all times properly operated, should furnish a supply of water of satisfactory sanitary quality.
2. That the old Mills supply as shown by analysis has been subject to a certain amount of pollution, and is also inadequate in quantity.

I would therefore recommend:

1. That the village authorities continue to operate the purification works with constant care and attention.

2. That in view of the fact that the Mills Water Works Company find it necessary to supplement their supply by means of water from the village mains, the springs and collecting tile constituting this system be disconnected therefrom, and the village water be supplied only.

I would further recommend that copies of this report be transmitted to the village authorities, the Mills Water Works Company, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 21, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
MILLS WATER COMPANY SUPPLY (OLD)																					
Mt. Morris	Livingston	Tap, Mills supply	1/ 4/13	5	Cl.	....	....	263	....	....	.003	.048	.003	3.00	1.00	6.87	191.0	168.0	6,600	—	—	—
Mt. Morris	Livingston	Tap, Mills supply	3/14/13	3	Tr.	....	....	253	....	....	.022	.072	.002	2.60	0.80	6.50	183.0	165.0	400	—	—	—
Mt. Morris	Livingston	Tap, Mills supply	4/30/13	3	Tr.	....	....	250	....	....	.004	.026	.007	2.40	1.30	5.75	180.0	155.0	19,500	+	—	—
Mt. Morris	Livingston	Tap, Mills supply	6/11/13	Tr.	Cl.	....	....	250	....	....	.004	.016	.001	2.40	0.10	6.00	195.0	173.0	700	+	+	—
MUNICIPAL SUPPLY (NEW)																					
Mt. Morris	Livingston	Filtered water	11/ 9/15	Tr.	Cl.	1 v.	1 v.	123	22	101	.010	.152	.001	0.10	5.40	.....	77.0	75.0	40	—	—	—
Mt. Morris	Livingston	Raw water	12/15/15	5	2	1 a.	1 a.	160	20	140	.020	.192	.005	0.10	5.00	4.00	74.0	55.0	120	—	—	—
Mt. Morris	Livingston	Filtered water	12/15/15	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	80	—	—	—
Mt. Morris	Livingston	Raw water	4/ 4/16	5	2	2 v.	2 v.	128	15	113	.052	.172	.001	0.60	4.30	3.75	83.0	73.0	*3,100	+	—	—
Mt. Morris	Livingston	Filtered water	4/ 4/16	5	Tr.	1 v.	1 v.	115	8	117	.016	.092	.001	0.60	1.10	3.75	64.0	63.0	*500	—	—	—
Mt. Morris	Livingston	Raw water	7/11/16	5	Tr.	1 v.	1 v.	....	....	....	.003	.034	.001	0.44	2.60	3.75	83.0	68.0	*18,000	—	—	—
Mt. Morris	Livingston	Filtered water	7/11/16	Tr.	Tr.	1 v.	1 v.	....	....	....	.005	.078	.001	0.44	1.50	3.75	77.0	67.0	20	—	—	—
Mt. Morris	Livingston	Raw water	1/10/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	†30	—	—	—
Mt. Morris	Livingston	Filtered water	1/10/17	5	Tr.	1 v.	1 v.	....	....	....	.003	.170	.003	0.16	3.20	3.50	79.0	73.0	20	—	—	—
Mt. Morris	Livingston	Raw water	2/ 7/17	5	Cl.	2 a.	2 a.	....	....	....	.038	.162	.012	0.18	2.20	4.00	67.0	77.0	45	0+3—	0+3—	0+3—
Mt. Morris	Livingston	Filtered water	2/ 7/17	5	Cl.	1 a.	1 a.	....	....	....	.018	.158	.006	0.14	2.60	4.25	80.0	77.0	250	1+2—	0+3—	0+3—
Mt. Morris	Livingston	Mills supply	1/10/17	3	2	1 v.	1 v.	249	24	225	.078	.070	.003	0.80	1.70	3.75	222.0	176.0	.....	.....	.....	.....

* Delayed in transit. † Frozen.

MOUNT UPTON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Mt. Upton, made by Mr. C. M. Baker, assistant engineer, on April 12, 1917.

Mt. Upton is an unincorporated village of about 400 inhabitants, located in the town of Guilford, Chenango county, on the New Berlin branch of the N. Y., Ontario & Western railroad, about 9 miles north of Sidney. There are several private sewer systems in the village, which discharge without treatment into the Unadilla river. These sewers serve about half the population, the rest of the houses being served with privies and cesspools.

The water supply is owned by Mrs. C. G. Brooks of Norwich, N. Y., and is derived from the springs and a well located on a hill about one mile west of the village, also from a well located in the western edge of the village. The supply was first put in operation about 1900. The well in the westerly edge of the village, however, is used only as an auxiliary supply, and was put in operation about ten (10) years ago. From the spring the water flows by gravity into an adjacent covered reservoir, and the water from the nearby well is pumped into the same reservoir. From this reservoir the water flows by gravity to the village. The water from the well in the edge of the village, however, is pumped into a small tank on an elevated tower near this well and when this supply is used the water from the reservoir is allowed to flow into the tank before entering the village. As this tank is at a considerably lower elevation than the reservoir, the pressure in the distribution system is thus reduced. There are in all 4½ or 5 miles of mains, all of which are 2 inches in diameter. This supply, however, is used only for domestic purposes, no fire protection being provided. Practically all of the population of the village is served by the water, there being in all about 100 service taps, none of which are metered. Since there are no meters nor other method of measuring water used no definite information could be obtained regarding the consumption, but based on a per capita rate of 100 gallons daily, the total consumption would be about 40,000 gallons per day.

The storage reservoir is constructed of concrete and is covered with a wooden roof. Its capacity is about 18,000 gallons. The elevated tank is constructed of wood, is 13 feet in diameter by 16 feet high, and has a capacity of approximately 16,000 gallons.

The pumping equipment used in connection with the auxiliary well consists of a 4 h. p. Fairbanks-Morse & Company, gasoline engine belted to a small double acting plunger pump.

The spring from which the supply is regularly derived consists of collecting tile laid below the surface, which collects the ground water and discharge it into a collecting basin constructed of masonry and provided with a wooden cover. From this collecting basin the water flows by gravity into the storage reservoir. The well located near the spring is curbed to a depth of 6 feet with stone and is drilled for the rest of the depth. No information could be obtained, however, regarding the depth of this well and the strata through which it is drilled. A wind mill pumps water from this well into the reservoir. The spring, the reservoir and this well are located in pasture land, the springs and reservoir being enclosed by fences, however, while the well is not so protected.

The well in the western edge of the village, used as an auxiliary supply, is located at the foot of a steep hill. The well is 6 inches in diameter and drilled to a depth of 165 feet through gravel, clay, sand and rock, water being obtained from the rock formation. Definite information regarding the extent of these various strata was not available at the time of the inspection. The pump house is a frame structure located directly over the well, a mound of dirt being thrown up about it so that no surface drainage can find its way into it. The pump house is provided with a concrete floor and the pumps are located in a concrete pit, about 6 feet deep, and the engine is supported on

timbers at the top of this pit. A barn is located within about 125 feet, and a school house, with outside privies 150 feet from the well. These buildings are, however, at considerably lower elevations than the well, and there seems to be little possibility of contamination of the supply from these premises.

Samples of water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show water satisfactory in physical quality with respect to color and turbidity, and also a water that is low in hardness. The figures for nitrogen in its various forms are low, as are also the figures for oxygen consumed and chlorine. The bacterial counts are usually low, but colon bacilli are frequently present in 10 c.c. inoculations, thus indicating the presence of active contamination. It is probable that this contamination is caused by the rapid infiltration of surface wash from pasture land into the ground water tributary to the supply, and that it is of animal rather than of human origin.

As a result of this investigation it may be concluded:

1. That the water supply of Mt. Upton is derived from a source which is subject to some indirect pollution by surface wash from pasture land.
2. That although apparently adequate for domestic purposes, the supply is inadequate for fire protection.

In view of the above, I beg to offer the following recommendations to be acted upon by the owner of the water supply:

1. That a larger area about the springs and reservoir and including the well located nearby be enclosed by a substantially constructed fence, and that drainage ditches be provided to divert surface wash from this area.
2. That adequate area be enclosed about the well in the western edge of the village, and suitable drainage ditches provided to protect this source of supply from pollution by surface wash.
3. That consideration be given to the development of an adequate supply for fire protection.

Finally, I would recommend that copies of this report be sent to the owner of the water supply, the local health officer, and the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 24, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Mt. Upton	Chenango	Tap, public supply	1/31/12	Tr.	Cl.			54		26	.010	.010	.001	0.30	0.20	0.75	24.7	24.0	20	—	—	—
Mt. Upton	Chenango	Tap, public supply	3/ 8/12	Tr.	Cl.			44		37	.008	.018	.001	0.26	0.30	0.50	24.7	21.0	20	—	—	—
Mt. Upton	Chenango	Tap, public supply	4/10/12	Tr.	Cl.			43		25	.004	.014	Tr.	0.20	0.20	0.62	19.5	14.0	80	—	+	—
Mt. Upton	Chenango	Tap, public supply	10/14/12	Tr.	Cl.			64		54	.004	.014	Tr.	0.40	0.80	1.00	39.0	26.0		+	—	—
Mt. Upton	Chenango	Tap, public supply	11/15/12	Tr.	Cl.			33		26	.020	.020	.002	0.26	0.50	1.00	25.0	20.0	30	—	—	—
Mt. Upton	Chenango	Tap, public supply	12/ 7/12	5	2			40		27	.003	.022	Tr.	0.36	1.00	1.00	22.1	18.0	70	—	—	—
Mt. Upton	Chenango	Tap, public supply	2/ 7/13	Tr.	Cl.			54			.001	.018	Tr.	0.30	0.70	1.00	22.1	18.0	15	—	—	—
Mt. Upton	Chenango	Tap, public supply	3/19/13	Tr.	Cl.			40			.018	.016	Tr.	0.34	0.40	0.75	19.5	15.0	80	—	—	—
Mt. Upton	Chenango	Tap, public supply	4/23/13	Tr.	Cl.			87			.010	.004	Tr.	0.20	0.30	0.75	24.7	19.0	20	—	—	—
Mt. Upton	Chenango	Tap, public supply	6/4 /13	Tr.	Tr.			36			.018	.016	Tr.	0.10	0.60	0.75	20.8	20.0	120	—	—	—
Mt. Upton	Chenango	Tap, public supply	7/16/13	2	Cl.			51			.004	.004	.001	0.12	0.30	0.75	29.9	29.0	30	—	—	—
Mt. Upton	Chenango	Tap, public supply	3/31/14	Tr.	Tr.			33		20	.028	.028	Tr.	0.70	0.60	1.25	16.9	14.0	425	+	—	—
Mt. Upton	Chenango	Spring	4/12/17																			
Mt. Upton	Chenango	Tap, in village; spring supply	4/12/17	Cl.	Tr.	1 v.	1 v.				.010		.002	Tr.	0.80	0.25	46.4	20.0	40	0+3—	0+3—	0+3—
																			10	1+2—	0+3—	0+3—

NEWARK

(N. Y. Custodial Asylum for Feeble-Minded Women)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon plans for water filters at the New York State Custodial Asylum for Feeble-Minded Women, Newark, N. Y.

Plans and specifications for a proposed filter plant for treating the Erie canal water for hot water purposes at the Newark Custodial Asylum were approved by this Department on November 27, 1916. Later, plans for modifications in water main connections, not affecting the proposed filtration plant, however, were approved on March 3, 1917.

On April 17, 1917, drawings Nos. N-2677-D9 and N-2678-D9, prepared by the Norwood Engineering Company, contractors for the filtration plant were submitted by the State Architect. These drawings showed slight modifications in arrangement of the piping system connected with the filters, but the essential features of the design remained the same as in the plans previously approved. The details of the coagulation feed apparatus were not given, however, and upon request drawing N-4-D59 of the Norwood Engineering Company was submitted by the State Architect on April 23, this drawing being followed on May 3 by a copy of a letter from the Norwood Engineering Company, giving a detailed description of the method of operation of the coagulation feed device.

From an examination of these drawings, the numbers of which are given above, it is evident that no material change has been made in the plans previously submitted and approved on November 27, 1916. I would recommend, therefore, that these plans be approved.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 3, 1917

NEWBURGH

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the sanitary condition of the public water supply of Newburgh, made by Mr. C. M. Baker, assistant engineer, on April 4, 1917.

General information

Location.— Northeastern corner of Orange county, on west bank of Hudson river.

Population.— 27,876, all of which is served with the water.

Source of Supply.—Washington lake, which is fed by small brooks having a watershed area of 8.8 square miles.

Consumption.— 4,900,000 gallons, an equivalent of 176 gallons per capita per day.

Distribution System.— Forty-two miles of water mains, ranging from 4 to 30 inches in diameter.

Service Taps.— 4,750, only a few of which are metered.

Pressure.—30 to 130 pounds per square inch.

Storage.— Washington Lake, 1,000,000,000 gallons; Lockwood basin, 36,000,000 gallons.

Purification.— Sterilization with liquid chlorine, formerly with hypochlorite of lime.

Reference to Previous Investigations.— Page 768 of 29th Annual Report, and page 374, vol. 2 of the 35th Annual Report.

At the time of the previous investigation considerable trouble was experienced because of tastes and odors in the water. Due to these unsatisfactory conditions and because of certain pollution of the water, recommendations were made at that time concerning:

1. Continuing the maintenance of careful oversight of the sanitary conditions on the watershed.
2. Maintaining the application of hypochlorite.
3. The application of copper sulphate to check algae growths.
4. Filtration and aeration if the carrying out of the previous recommendations did not secure satisfactory results.
5. Separation of auxiliary mill supplies from the city system.

As a result of the present investigation it is apparent that the water commissioners are carefully supervising the watershed, regular inspections being made and no insanitary conditions being observed at the time of this inspection. The application of hypochlorite of lime to the water has been discontinued, but apparatus has been provided and the supply is now being sterilized with liquid chlorine. Copper sulphate is used at various times during the year to prevent algae growth. It is thus apparent that the city authorities have carried out practically all of the recommendations, except No. 5, relating to connections with auxiliary mill supplies.

The general sanitary conditions on the watershed are practically the same as described in the previous report and, therefore, will not be considered in detail at this time. It should be pointed out, however, that certain pollution from barn yards and pasture land on the watershed at all times finds its way more or less directly into the supply.

These conditions, and the results of analyses of the water also, indicate that sterilization of the supply should at all times be maintained in order to assure the delivery of a satisfactory quality of water to the city.

The plant for sterilizing the water with liquid chlorine is a dry feed automatic control apparatus manufactured by Wallace & Tiernan Company, and was installed and put into operation about June 1, 1916. Prior to this time and since 1914 the water was sterilized with hypochlorite of lime. The application of the chlorine is automatically controlled proportional to the flow of water by a connection between the control valve of the apparatus and a Venturi meter. The chlorine gas is applied into the main leading from the lake to the village. Scales are provided for determining the amount of chlorine actually applied and complete records are kept of the operation of the plant. No trouble has been experienced in the operation of the apparatus since its installation. The following table, made up from the records of operation, shows the amount of chlorine being applied in pounds and in parts per million, also the amount of water pumped:

RECORD OF OPERATION OF CHLORINE PLANT

DAY OF MONTH	OCTOBER, 1916			FEBRUARY, 1917			MARCH, 1917		
	Million gallons of water	Lbs. of chlorine	Parts per million chlorine	Million gallons of water	Lbs. of chlorine	Parts per million chlorine	Million gallons of water	Lbs. of chlorine	Parts per million chlorine
1	4.29	5.5	.16	.....	.....	.....	5.03	16.0	.38
2	4.94	7.0	.17	.....	.....	.....	5.14	16.0	.38
3	4.94	7.5	.18	.....	.....	.....	5.33	19.0	.43
4	5.30	7.5	.17	.....	.....	.....	4.21	12.0	.35
5	4.48	8.5	.18	.....	.....	.....	5.15	17.5	.41
6	4.90	6.5	.16	.....	.....	.....	5.71	16.0	.34
7	4.98	6.5	.16	.....	.....	.....	4.99	14.0	.34
8	4.49	6.5	.17	.....	.....	.....	5.19	16.0	.37
9	4.97	6.5	.16	.....	.....	.....	5.12	14.0	.33
10	5.39	6.5	.14	.....	.....	.....	5.09	14.0	.33
11	5.27	7.5	.17	.....	.....	.....	4.64	13.0	.34
12	4.89	7.0	.17	.....	.....	.....	5.20	13.5	.31
13	4.62	6.5	.17	.....	.....	.....	5.16	13.5	.30
14	5.12	6.0	.14	.....	.....	.....	5.12	12.0	.29
15	4.29	6.0	.17	.....	.....	.....	5.12	13.0	.31
16	4.91	7.0	.17	.....	.....	.....	5.46	15.0	.33
17	4.76	6.0	.15	.....	.....	.....	4.70	12.0	.31
18	5.35	6.0	.14	.....	.....	.....	4.64	11.0	.29
19	4.91	6.0	.15	.....	.....	.....	4.73	12.5	.35
20	4.82	6.5	.16	.....	.....	.....	5.02	12.5	.32
21	4.68	6.5	.17	5.02	10.5	.25	5.33	12.5	.31
22	4.35	7.0	.20	5.38	17.5	.39	4.68	10.0	.26
23	5.01	7.0	.17	5.25	15.0	.34	4.61	11.5	.30
24	4.90	7.0	.17	4.97	11.0	.27	4.74	11.5	.30
25	5.39	7.0	.16	4.71	11.5	.30	4.12	12.5	.40
26	4.88	7.0	.17	5.15	10.0	.24	4.88	13.3	.33
27	4.89	6.0	.15	5.26	18.0	.41	4.78	12.5	.32
28	4.59	6.0	.16	5.69	17.5	.37	5.04	13.0	.31
29	4.35	6.0	.17	.....	.....	.....	4.51	10.0	.28
30	4.97	6.0	.15	.....	.....	.....	4.58	11.0	.29
31	4.96	6.0	.15	.....	.....	.....	4.65	11.5	.30
Maximum	5.39	7.5	.20	5.69	18.0	.41	5.71	17.5	.43
Minimum	4.29	5.5	.14	4.71	10.5	.24	4.12	10.0	.26
Average	4.85	6.5	.16	5.18	13.9	.32	4.93	13.3	.33

The values recorded for the month of October, 1916, are representative of the conditions under which the plant was then being operated. During several weeks of the winter the plant was out of service, but was put in operation again on February 21, 1917, since which time the table shows complete records. During the fall a much smaller amount of chlorine was being applied than at the time of this inspection. The results appear to be fairly uniform, since the amount of chlorine applied in parts per million is fairly uniform, when the apparatus is adjusted to the desired amount, regardless of variations in the amount of water treated.

Numerous complaints have arisen during the past winter regarding tastes and odors in the water. This trouble was generally attributed to the chlorine treatment and there developed therefore considerable sentiment against this method of purification. In fact, some city officials went so far as to recommend the discontinuing of the application of chlorine.

In order to present a parallel of conditions existing during the past winter and one year ago, a description will first be given of the condition of the supply during the winter of 1915 and 1916, then of the present winter. In the fall of 1915 the lake was treated with 3,500 pounds of copper sulphate

at a time when it was about half full of water. Rains in the fall filled the lake practically full of water, so that it was possible to draw continuously from the upper or middle intake. During the winter following no complaints were made and no trouble was experienced from tastes and odors in the water, although hypochlorite was used as a disinfectant. In the fall of 1916, however, there was a very heavy growth of algae and only 1,800 pounds of copper sulphate were used, due to the difficulty in obtaining this chemical. The lack of rains in the fall left the lake only partially full, making it necessary to draw water continuously from the bottom intake or practically from the bottom of the lake. Furthermore, the winter was severe and the lake was frozen over continuously, thus preventing aeration of the water. Samples of the water taken before and after chlorination are said to have produced odors very similar. From January 8 to February 21 the application of liquid chlorine to the water was discontinued and it was stated that during this period there was apparently no diminution in the number of complaints. It is quite evident, therefore, that the tastes and odor in the water during the past winter were due to the accumulation of algae growth and other organic matter and to insufficient aeration during the winter and that the treatment of liquid chlorine was not even a contributory cause. Furthermore, in view of the possibility of contamination of the supply from inhabitants on the watershed, it seems essential, as stated above, that the chlorine be continuously applied to the water in order to at all times render it safe for potable purposes.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of preceding analyses are recorded in the appended table.

The summary of analyses, prior to sterilization, shown in the appended table shows clearly the polluted condition of the raw water and the necessity of purification in order to render it satisfactory for potable purposes. The series of analyses when hypochlorite was being applied as a disinfectant shows the efficiency of this method of purification, since in no case were large numbers of bacteria found in the treated water nor were colon bacilli found present. Similar results have been obtained by the use of liquid chlorine except in the sample collected at the time of the inspection, at which time analyses showed practically no reduction in bacteria and colon bacilli present in the treated water. At this time, as stated above, approximately ⅓ of a part per million of chlorine was being used, and the fact that more adequate purification is not obtained is probably due to the high organic content of the water, which, as indicated by the oxygen consumed test, was equivalent to 5 parts per million. In fact, there is considerable variation in the organic content of this water ranging from 1.9 to as high as 7.3 parts per million. It is thus apparent that variation should be made in the amount of chlorine being applied, depending upon the condition of the water, and it is evident that at the time of the inspection an insufficient amount was being applied to secure satisfactory sterilization, although previous analyses indicate that satisfactory results have been obtained.

In view of the above, it may be concluded:

1. That the city of Newburgh has apparently endeavored to carry out the previous recommendations of this Department.

2. That the complaints and trouble from tastes and odor in the water during the past winter have been due not to the treatment of the water with liquid chlorine but to accumulation of algae and organic matter and a combination of circumstances.

3. That there appears to be a tendency to use a limited amount of this chemical in the treatment of the water, probably due to the agitation against the chlorine treatment.

In view of the above, I beg to offer the following recommendations to be acted upon by the city authorities:

1. That the careful supervision of the watershed be continued.

2. That the chlorine plant be operated at all times and that a sufficient amount of chlorine to secure satisfactory disinfection of the water — not less than .25 parts per million — be applied continuously.

3. That more effective treatment of the water with copper sulphate to prevent algae growth be maintained in order to prevent disagreeable tastes and odors.

4. That if treatment with copper sulphate appears to be undesirable or does not produce desirable results, consideration be given to permanent improvement of the supply by aeration and filtration.

5. That careful inspection and supervision be maintained over all connections between the city mains and those of polluted auxiliary fire supplies of mills and that at the earliest opportunity a complete severance of these connections be made.

Finally, I would recommend that copies of this report be transmitted to the health officer, the city authorities and the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 15, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			Bacteria per c.c.; gelatin 20°, 48 hours	B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
SUMMARY OF ANALYSES PRIOR TO STERILIZATION																							
Newburgh	Orange	Tap, public supply, maximum		5	2										1.90				130			
Newburgh	Orange	Tap, public supply, minimum		35	25										5.70				8,800			
Newburgh	Orange	Tap, public supply, average		20	8										4.66				1,370	89%+	59%+	6%+
HYPOCHLORITE USED AS A DISINFECTANT																							
Newburgh	Orange	Silver stream, raw water	11/19/14																4,600	3+0—	3+0—	2+1—
Newburgh	Orange	Washington lake, raw water	11/19/14	10	4	1 v.	1 v.	132	55	77	.038	.174	.002	0.06	7.30	2.50	39.0	38.0	120	2+1—	2+1—	1+2—
Newburgh	Orange	Tap, public supply	11/19/14																10	0+3—	0+3—	0+3—
Newburgh	Orange	Silver stream, raw water	6/ 1/15																120	—	—	—
Newburgh	Orange	Patten creek, raw water	6/ 1/15																40	—	—	—
Newburgh	Orange	Tap, public supply	6/ 1/15	10	2			70	56		.012	.105	.002	0.10	5.10	2.50	41.60	31.00				
LIQUID CHLORINE USED AS A DISINFECTANT																							
Newburgh	Orange	Raw water at intake	8/17/16																140	+	—	—
Newburgh	Orange	Tap, city hall	8/17/16	8	Cl.	2 a.	2 a.				.014	.182	.001	0.02	1.70	2.75	57.1	43.0	5	—	—	—
Newburgh	Orange	Raw water at intake	11/21/16																30	—	—	—
Newburgh	Orange	Tap, treated water	11/21/16	8	3	1 a.	1 a.				Tr.	.216	.001	0.02	7.30	1.63	88.6	56.0	5	—	—	—
Newburgh	Orange	Raw water at intake	3/ 9/17																2,000	3+0—	3+0—	0+3—
Newburgh	Orange	Tap, treated water	3/ 9/17	32	3	3 a.	3 a.				.124	.293	.013	0.18	5.20	3.0	50.0	30.0	15	0+3—	0+3—	0+3—
Newburgh	Orange	Raw water at intake	4/ 5/17																300	3+0—	0+3—	0+3—
Newburgh	Orange	Tap, Wisner avenue and Broadway	4/ 5/17	32	Tr.	1 m.	4 m.				.032	.175	.002	0.02	3.00	2.75	39.7	34.0	70	2+1—	1+2—	0+3—
Newburgh	Orange	Tap, city hall	4/ 5/17																550	3+0—	0+3—	0+3—

NEWPORT

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Newport made by Mr. C. M. Baker, assistant engineer, on October 26, 1916.

Newport is an incorporated village of about 700 inhabitants located in Herkimer county on West Canada creek and the Adirondack division of the New York Central railroad 13 miles north of Herkimer. It is the center of a prosperous dairying district. There are three or four private sewer systems in the village, each having 4 to 8 connections, which discharge without treatment into the creek. The majority of the houses in the village, however, are served by privies, cesspools, etc.

The water supply was originally put into operation about 30 years ago by a private concern. About 1912, however, the supply was taken over by the village and improvements made by constructing a new reservoir and distribution system. Greater care has since been exercised regarding the sanitary conditions in the vicinity of the springs from which the supply is derived. From the springs, which are located about half a mile north of the village, the water flows into a connecting basin, whence it flows by gravity to a storage reservoir, thence by gravity to the village. About 98 per cent of the population are served with the water, there being in all 150 service taps, none of which are metered. The pressure in the main part of the village averages approximately 63 pounds per square inch. No definite information could be obtained regarding the amount of water actually used. It is stated, however, that estimates of the flow of the springs as now developed showed a flow of about 54,000 gallons for February, 70,000 for March, 54,000 for April and 49,000 gallons for June. Based upon a per capita rate of 100 gallons daily, the total consumption would be approximately 68,000 gallons per day. On this basis it would seem that the consumption must now be nearly equal to the yield of the springs. It is probable, however, that by more adequate developments a greater supply of water could be obtained from the springs now in use. In addition to these springs, however, the village has purchased additional springs and 70 acres of land, which includes the surface watershed tributary thereto, about one-fourth of a mile north of the present springs. Development of these new springs and more adequate development of the ones now in use would doubtless furnish an abundant supply of water for the village.

The springs from which the supply is now derived are located in a ravine on the north side of a high hill and at the foot of a very steep slope. The water is collected from the springs by means of iron pipes which discharge into a crib-like collecting basin constructed of 2 by 6 timbers laid flatwise. From this collecting basin the water flows through cast iron pipe around the hill to the storage reservoir which is constructed of concrete. The walls of the reservoir extend 2 to 4 feet above the ground and are surmounted by a fence constructed of half-inch mesh screens. The capacity of the reservoir is about 300,000 gallons, an equivalent of 4 or 5 days' consumption.

The village owns about 1 acre of land in the vicinity of the springs. This area, however, is not enclosed by a fence and it is possible that at times cattle find their way to the vicinity of the springs. The topographical conditions, however, and the general appearance at the time of the inspection indicate that cattle do not frequent this vicinity. The village has considered the advisability of purchasing additional land about these springs and enclosing the same by suitable fences to exclude cattle from this area.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory with respect to color and turbidity except in one case where the color was 5 and the turbidity 30. At this same time the oxygen consumed was 7.30. These results, however,

are far in excess of any others in the series of analyses, and are probably due to some local disturbances not generally affecting the supply. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low. Those for nitrates and chlorine, however, appear to be somewhat above normal. The bacterial counts prior to 1913 were occasionally very high and colon bacilli were usually present in the 10 c.c. inoculations and occasionally present in 1 c.c. inoculations, thus indicating the presence of active and potentially dangerous contamination. Since and including 1913, however, the bacterial counts have been low and colon bacilli found present only in one 10 c.c. inoculation. The more satisfactory results which have been obtained recently are probably due to improvements in the supply inaugurated at the time the village took charge.

The results of the analysis of the sample collected from the fountain at the watering trough in the center of the village show a rather high bacterial count for a spring water, but colon bacilli were absent. The source of this supply was not inspected, due to the lack of time, but it is said to be a spring located near the village and that it is not subject to pollution. The water from the fountain is used to a considerable extent for drinking purposes.

As a result of this investigation it may be concluded that the public water supply of Newport is derived from a source which should furnish water of a satisfactory quality providing the springs are at all times adequately protected from pollution. It is possible, however, that under the conditions which existed at the time of the inspection, pollution at times finds its way into the supply from surface wash.

In view of the above, I beg to recommend that the village enclose a sufficient area about the springs by a suitable fence, in order to prevent access of live stock, and that drainage ditches be constructed to divert all surface wash.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer.

ALBANY, N. Y., *January* 11, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Newport	Herkimer	Tap, public supply	2/16/11	Tr.	Tr.			164		130	.010	.020	.002	0.40	0.60	0.25	128.6	126.0	350	+	+	−
Newport	Herkimer	Tap, public supply	5/24/11	5	5			152		134	.014	.038	.001	0.20	1.00	0.75	120.0	112.0	100	−	−	−
Newport	Herkimer	Tap, public supply	10/12/11	Tr.	Cl.			152		129	.022	.052	.001	0.40	0.30	0.63	122.8	119.0	40	+	+	−
Newport	Herkimer	Tap, public supply	11/ 9/11	Tr.	Cl.			146		133	.012	.018	.001	0.50	0.40	0.50	125.8	125.0	425	+	+	−
Newport	Herkimer	Tap, public supply	12/27/11	Tr.	Cl.			153		143	.020	.028	.001	0.50	0.40	0.62	134.2	125.0	20	−	−	−
Newport	Herkimer	Tap, public supply	2/15/12	Tr.	Cl.			157		131	.016	.022	Tr.	0.60	0.10	0.50	122.8	120.0	15	+	−	−
Newport	Herkimer	Tap, public supply	3/20/12	Tr.	Cl.			152		130	.008	.004	Tr.	0.60	0.40	0.25	125.8	120.0	70	+	−	−
Newport	Herkimer	Tap, public supply	4/23/12	Tr.	Cl.			146		133	.006	.008	.001	0.48	0.30	0.75	122.8	118.0	950	−	−	−
Newport	Herkimer	Tap, public supply	9/11/12	Tr.	Cl.			248		217	.006	.006	Tr.	1.36	0.20	1.00	208.0	192.0	325	+	+	−
Newport	Herkimer	Tap, public supply	10/29/12	Tr.	Cl.			256		242	.012	.032	.001	1.00	0.80	1.00	243.0	207.0	50	+	−	−
Newport	Herkimer	Tap, public supply	12/11/12	0	Cl.			246		230	.012	.016	Tr.	0.70	1.10	1.25	218.0	202.0	110	−	−	−
Newport	Herkimer	Tap, public supply	1/16/13	Tr.	Cl.			144			.024	.014	Tr.	0.70	0.50	0.50	122.8	122.0	40	+	−	−
Newport	Herkimer	Tap, public supply	2/21/13	Tr.	Cl.			147			.020	.050	Tr.	0.50	0.60	0.75	125.8	119.0	60	−	−	−
Newport	Herkimer	Tap, public supply	4/ 3/13	5	30			139			.008	.170	Tr.	0.50	7.30	0.75	122.8	118.0	70	−	−	−
Newport	Herkimer	Tap, public supply	5/15/13	Tr.	1			157			.006	.012	Tr.	0.46	1.10	0.50	117.2	113.0	150	−	−	−
Newport	Herkimer	Tap, public supply	5/21/14	Tr.	Tr.			147		135	.010	.006	.001	0.60	0.60	0.50	122.8	122.0	20	−	−	−
Newport	Herkimer	Tap, public supply	10/26/16																55	0+3−	0+3−	0+3−
Newport	Herkimer	Collecting basin at springs									.004	Tr.	Tr.	0.64	0.40	1.25	140.0	120.0	30	0+3−	0+3−	0+3−
Newport	Herkimer	Tap in village	10/26/16	Tr.	Cl.	2 v.	2 v.															
Newport	Herkimer	Fountain at water trough not regular supply																	120	0+3−	0+3−	0+3−

NEW YORK CITY (Board of Water Supply)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

In accordance with your directions, I beg to submit the following report on an investigation of certain cases referred to you by the board of water supply of New York city of alleged pollution of streams tributary to the Ashokan reservoir.

The following cases were referred to you under date of March 26, 1917, viz.:

1. Lake View House, Pine Hill.
2. Cornish House, Pine Hill.
3. The Leonta, Pine Hill.
4. Residential property, Chichester.

The inspection of these cases was made on April 4, 1917, by Mr. C. A. Holmquist, assistant engineer of this Department, in company with Mr. Sidney K. Clapp, assistant engineer of the board of water supply, and Mr. Herman Goldberg, engineer of the office of Mr. Alfred D. Flinn, deputy chief engineer of the board of water supply, in the order given below.

1. *Lakeview House.*— The proprietors of this place are claimed to be Liegfield Leschziner, 510 West 110th street, New York city; Theo. Michel, 230 West 79th street, New York city, and Louis Kriger, 225 5th avenue, New York city. This house is a summer hotel located in the southern part of the village of Pine Hill, between the main road to Kingston and Birch creek, a tributary to Esopus creek. It is situated just below a large artificial lake formed by the construction of a dam across Birch creek, just above the hotel. This hotel accommodates about 100 persons. It is provided with a water supply and plumbing fixtures. Two cesspools, which are presumably operated in series, are located from 15 to 30 feet from a small stream tributary to Birch creek, one of the main branches of Esopus creek. The cesspool nearest the stream is provided with an overflow trough which terminates at the edge of the stream. A vitrified tile pipe from the hotel building and a 2-inch cast iron pipe from the laundry terminate near the edge of the same small stream referred to which flows through the property. The hotel was closed at the time of the inspection, so that no sewage was discharged into Birch creek or its tributaries, and this case did not, therefore, constitute a violation of section 76 of the Public Health Law. It is presumably a violation of rules 1 and possibly 5 of the rules and regulations of the board of water supply of New York city, in that one of the cesspools is provided with an overflow into the stream, and since two pipes which in all probability carry sewage when the hotel is occupied terminate at the edge of a small stream tributary to Birch creek and, therefore, these structures are so located as to threaten the pollution of a watercourse tributary to a reservoir of the water supply of the city of New York.

2. *Cornish House.*— This hotel is a summer hotel or boarding house, of which Mr. A. D. Hill of Pine Hill is proprietor. It is located on fairly high ground on the south side of Main street, in the village of Pine Hill. A small stream, which originates at a spring back of the hotel, flows through the property and discharges into Birch creek through a covered drain about 300 feet from the hotel. The hotel is provided with three cesspools, located 10, 25 and 30 feet respectively from the small stream referred to. No overflow pipes from these cesspools could be found and the hotel was not occupied at the time of the inspection, so that this case was not a violation of section 76 of the Public Health Law. It is questionable whether this case constitutes a violation of the rules and regulations of the board of water supply of the city of New York, inasmuch as these rules do not prescribe any limiting distances from streams tributary to a reservoir, of cesspools or other receptacles for the storage or deposit of human excreta, and since these cesspools if properly maintained might hardly be considered to threaten the pollution of the water supply of New York city.

3. *The Leonta.*— The Leonta is a summer boarding house, of which Mr. U. S. Grant Cure of Pine Hill is proprietor. It is situated on fairly high

ground, on Maple avenue, on the easterly side of Birch creek. A small covered stream tributary to Birch creek flows through one corner of the property. The hotel is provided with a cesspool, located on a terrace about 35 feet from Birch creek, and some 15 feet or 20 feet from the covered stream referred to. No overflow pipe from the cesspool to Birch creek or its tributary could be found and the proprietor of the hotel stated that the cesspool was not provided with an overflow. The Leonta was not occupied at the time of the inspection, and this case did not, therefore, constitute a violation of section 76 of the Public Health Law. As in the case of the Cornish House it is indeterminate as to whether this case is a violation of the rules and regulations of the board of water supply of the city of New York.

4. *Residential property, Chichester.*— This property is in the unincorporated village of Chichester, located about 1½ miles north of the village of Phoenicia in the town of Shandaken, Ulster county, at the confluence of Ox Clove and Stony Clove, comparatively small streams which discharge into Esopus creek about 1½ miles below Chichester and about 7½ miles above the Ashokan reservoir, measured along the stream, and about 14.5 miles from the intake at the reservoir.

Chichester has been almost entirely built up by William Schwarzwalder & Co., of which Mr. William O. Schwarzwalder is president and Mr. Burrell Schwarzwalder is general manager. This company operates a furniture factory or wood working mill at which some 85 men are employed at present. Most of the buildings at Chichester which are located in the vicinity of the factory are owned by this company and are occupied by the officers or employees of the company.

A sewer from an occupied store with living quarters upstairs owned by William Schwarzwalder & Co., was found terminating in the Stony Clove and a second sewer from an occupied dwelling owned by the same company was found discharging into a tail race tributary to Stony Clove. It was also admitted by Mr. Burrell Schwarzwalder that four other dwellings of the company, two of which were unoccupied at the time of the inspection, and a stable and office building are provided with sewers which terminate in the covered tail race which runs through the property of the company. Another empty dwelling of the company is also provided with a sewer which terminates in the open portion of the tail referred to. No permits have been issued by this Department for the discharge of sewage from any of the buildings of William Schwarzwalder & Company. It is obvious, therefore, that the discharge of sewage from the occupied store and from the occupied dwelling first referred to and the sewers from the buildings admittedly discharging sewage into the covered tailrace constitute violations of section 76 of the Public Health Law. These cases as well as the unoccupied houses referred to obviously also constitute violations of the rules and regulations of the board of water supply of the city of New York.

Summarizing briefly, I would state that it is apparent therefore that, for the purpose contemplated by this investigation, only one of the four cases referred to us for investigation constitutes in part a clear violation of section 76 of the Public Health Law which might be prosecuted by this Department under the provisions of section 76-a, and that the other three cases do not at this time constitute violations of section 76. Again, viewed from the standpoint of water rule violations, it appears that whereas two of the four cases referred to us for investigation may be considered violations of the rules and regulations of the board of water supply of the city of New York it is questionable if the remaining two cases, namely, The Leonta and the Cornish House, constitute violations of these rules.

It was understood at the conference held in New York January 19, 1917, that this Department would not assume, and there is some question in the writer's mind whether under the law we could assume, to enforce these rules and regulations of the board of water supply, since that board has been specifically granted this authority for itself in amendments made in 1915; nor, in fact, were we requested to do so at this meeting. We were told, however, that there were many serious cases which the board was unable, or at least thought it impracticable, to correct under the rules and regulations and

wished the assistance of the Department under its general powers, the only effective one, as the writer pointed out, being action under section 76-a. Action under section 76-a, as you know, involves a public hearing and an order by you, approved by the Governor and Attorney-General, enforceable by the Attorney-General.

In view of the fact that action under this section could be taken in only a part of one of the four cases referred to us by the board of water supply, and that a relatively unimportant one, it would seem questionable whether we should attempt to take this action in this case at this time, particularly since this case is one that is readily abatable as a violation of rules and regulations by the board of water supply. When the hotels are occupied later in the season, cases (1) and (2) would be actionable under section 76-a, if they have not been corrected before then. I would recommend therefore that this matter be left in abeyance for the time being and until the hotels, which constitute the more important cases referred to us, are occupied, at which time it would seem that action by this Department under section 76-a would be more logical and appropriate.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *April* 16, 1917

NORTH COLLINS

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of North Collins made by Mr. C. M. Baker, assistant engineer, on December 5, 1916.

North Collins is an incorporated village of 1,068 inhabitants located in Erie county on the Buffalo and Southwestern division of the Erie railroad 23 miles south of Buffalo. The village is on Sister creek, a small stream which flows into Lake Erie. A private sewer system serves about 50 houses of the village, the remainder being served by privies, cesspools, etc. The sewage is discharged without treatment into the creek.

The water supply is owned by the municipality and was first put into operation about October 1, 1916. The supply is derived from a dug well located about 1 mile south of the village, from which the water is pumped through the distribution system into a standpipe. About half of the population is served with the water, there being in all 100 service taps. Meters are to be provided for all taps and were being installed at the time of the inspection. There are in all about 5 miles of water mains ranging in size from 4 to 8 inches in diameter. The pressure in the village with the standpipe full is 60 to 65 pounds per square inch. According to the pump records since the installation of the supply the consumption averages about 23,000 gallons daily, an equivalent to 43 gallons per capita served.

The pumping equipment consists of two 14 horsepower natural gas or gasoline engines and two 6½-inch by 8-inch triplex Rumsey pumps, each having a capacity of 150 to 200 gallons per minute. The standpipe is constructed of steel, is 20 feet in diameter by 50 feet high and has a capacity of approximately 117,000 gallons.

The well from which the supply is derived is located near the edge of a large swamp area at the head of Sister creek, which extends about 3 miles south to Lawton Station. Concrete walls enclose the well, which is covered and adequately protected from surface wash. Adjacent to the well is the pumping station, the pumps being located in a pit 10 or 11 feet below the surface and the engines on the floor at ground level. The pumps are driven by a belt connection with the engines. The floor of the pump pit appeared to be tight and it is provided with a suitable drain so that there seems to be little or no danger of pollution of the supply due to drainage from the pump pit into the well.

As previously stated, the well is located near a large swamp area. It is, however, on comparatively high ground which slopes toward this area. Just to the east of the well is a small knoll beyond which are farm buildings about 300 feet from the well. The knoll between prevents any possibility of surface drainage from these buildings toward the well. The village owns about two acres of land in the vicinity of the well, which includes a part of the swampy area mentioned above, and extends part way up the side of the hill beyond the well. The remainder of the area sloping toward the well is used as a berry patch and is undoubtedly at times heavily fertilized. No fence is provided about the area owned by the village nor have drainage ditches been constructed to divert surface wash. Although, as previously stated, the well is so constructed that surface wash cannot find its way into it, there appears to be some possibility of indirect pollution at times due to the infiltration of surface water from the cultivated land just above the well.

Samples of the water were collected at the time of the inspection and also later by the health officer and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of these analyses show a water slightly colored and somewhat turbid. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low. Those for nitrates and chlorine, however, appear to be somewhat above normal, thus indicating that pollution finds its way into the ground water tributary to the supply. The source of this pollution is probably of animal rather than human origin. The bacterial counts are low in both samples collected and colon bacilli were not found present.

The turbidity of the water indicated by the analyses was not observed at the time of the inspection. In order therefore to obtain additional information the health officer was later asked to collect a sample for chemical analysis. In his letter informing us that this sample had been forwarded to the laboratory he mentioned the fact that the water was turbid the day before collecting the sample. In reply to a letter of inquiry from us regarding the cause of this turbidity he stated that it might be caused by disturbances in the well at time of pumping or to the collection of sediment in the mains but probably not by surface water finding its way into the supply. The exact cause of the turbidity therefore cannot be definitely stated at this time.

As a result of this investigation it may be concluded that the water supply of North Collins is derived from a source which should furnish a satisfactory supply of water provided the well is at all times properly protected from pollution. It appears, however, that there is some possibility of pollution by the infiltration of surface water from nearby cultivated land. Furthermore, the water is at times turbid, probably due, however, to some local disturbance in the well or mains.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That the area owned by the village be enclosed by suitable fence in order to prevent trespassing in the vicinity of the well.
2. That suitable drainage ditches be constructed to divert surface wash from the cultivated land just above the well.
3. That the source or cause of the turbidity be definitely determined and steps immediately taken to prevent its recurrence.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *February* 28, 1917

REPORT OF WATER ANALYSES FOR NORTH COLLINS

Source	Tap in village	Tap, pump station	Tap in village
Collected on	12/5/16	12/5/16	1/29/17
Color	5	.....	Tr.
Odor, hot	1 v.	.....	1 v.
Odor, cold	1 v.	.....	1 v.
Turbidity	15	.....	2
Solids, total	108	.....	.....
Loss on ignition	22	.....	.....
Mineral residue	86	.....	.....
Ammonia, free	Tr.	.....	.008
Ammonia, albuminoid	.014	.....	.036
Nitrites	.005	.....	.01
Nitrates	0.80	.....	3.52
Oxygen consumed	0.55	.....	0.20
Chlorine	3.50	.....	3.75
Hardness, total	55.7	.....	54.30
Alkalinity	28.0	.....	20.00
Iron	.....	.....	0.20
Bacteria per c.c	30	5	.....
B. coli type 10 c.c.	0+3—	0+3—	.....
B. coli type 1 c.c.	0+3—	0+3—	.....
B. coli type 1/10 c.c.	0+3—	0+3—	.....

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

NORTH CREEK

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of North Creek made on April 20 and 21, 1917, by Mr. M. F. Sanborn, assistant engineer in this Department, who was assisted at the time of the inspection by Mr. Thomas Alexander, superintendent.

North Creek is an unincorporated village with a population of about 500 located in the northern part of Warren county on the Hudson river. It is a terminal of the Adirondack Division of the Delaware and Hudson railroad about 58 miles northwest of Saratoga Springs. About 25 per cent of the houses are served by a private sewer which discharges into the Hudson. The remaining houses are served by cesspools and privies.

The regular source of water supply is a small brook about three-fourths of a mile west of the village. Auxiliary supplies are obtained from a pond in the southern part of the village, from a brook 1¼ miles southwest of the village and from the Hudson river. The waterworks are owned and operated by the North Creek Water Works Company, of which Mrs. Gertrude Baker is owner and Mr. Thomas Alexander superintendent. The works were constructed in 1893.

Some 200 people or 40 per cent of the population are served by this supply with an average daily consumption of about 20,000 gallons. The water is also used by the railroad for locomotive feed purposes. There are about two miles of water mains ranging from 1¼ inches to 4 inches in diameter. Of the 40 service taps none are metered. The water from the various sources is distributed by gravity save in the case of the Hudson river. The average pressure in the village varies from 40 to 60 pounds per square inch. Fire protection is provided by two hydrants centrally located.

The regular supply, derived from the small brook northwest of the village, has been developed by the construction of a small dam across the brook through which the pipe line to the village passes, the intake end of this pipe being protected by a strainer. The basin formed by this dam is about 15 by 30 feet in plan with an average depth of 4 feet and a capacity of 13,500 gallons. The intake strainer frequently clogs up, shutting off the supply, and

during a considerable portion of the summer the stream is dry and the auxiliary supplies have to be used.

The first auxiliary supply is obtained from a pond about 60 by 30 feet in plan, 3 feet deep and fed largely by the overflow from a nearby spring. The capacity of this pond is 43,500 gallons. This supply is also at times insufficient for the needs of the village. The second auxiliary supply was developed about 4 years ago by the laying of some 6,000 feet of 2-inch galvanized iron pipe to the brook located about 1¼ miles southwest of the village. This pipe is laid on the surface of the ground and is connected during the summer only. In the summer of 1916 this stream also went dry and it was necessary to pump directly from the Hudson river.

The intake of the auxiliary supply from the river is located at the upper end of the village at a pumping station installed by the railroad company to pump water for their locomotives. This pumping station is operated by steam derived from a locomotive and therefore can be operated only when a locomotive is available. The intake extends about 30 feet from shore into 6 feet of water. The pumping equipment consists of a Blake direct-acting pump with about 6-inch stroke and 6-inch diameter.

The watershed tributary to the main supply is about 1½ square miles in area consisting of uninhabited wooded land. There are no permanent sources of pollution upon this watershed and the supply is practically free from possibilities of contamination. The spring-fed pond, constituting the first auxiliary supply, has practically no surface watershed. There are two houses, however, about 100 feet distant and an insanitary privy is located on the slope about 70 feet distant and a barn about 100 feet distant. The pond is also visited to a considerable extent by children playing in its vicinity. The watershed of the auxiliary brook supply southwest of the village is approximately 2 square miles in area, consisting of the wooded slopes of rather precipitous mountain sides. This supply is also of a reasonably satisfactory sanitary quality, due to the fact that there are no permanent sources of pollution upon the watershed. The Hudson river above the point of auxiliary intake has a watershed of many square miles, upon which are located several hamlets and many scattered dwellings. The river receives considerable pollution both direct and indirect and cannot be considered as safe from a sanitary standpoint without adequate purification.

At the time of the inspection samples of water were collected from the various sources and the results of the analyses of these samples made by the Division of Laboratories and Research will be found in the appended table.

The results of the analysis of the regular supply show a water slightly colored, free from turbidity and very soft. The figures for nitrogen in its various forms are low, indicating the presence of moderate amounts only of nitrogenous organic matter. The figure for oxygen consumed, however, is somewhat high, indicating the occurrence of considerable carbonaceous organic matter, due to the decaying vegetation upon the watershed. The total bacterial count is very high, but this is probably due in part to the multiplication of harmless forms of water bacteria during transit, the samples being two days in reaching the laboratory. Organisms of the B. coli type, however, were not isolated in the inoculations tested, indicating the absence of active contamination at the time of the collection of the samples.

The results of the analysis of the auxiliary pond supply show a slightly colored water free from turbidity and slightly harder than the regular supply. The figures for nitrogen in its various forms and for oxygen consumed are moderate. The figures for chlorine are very high, indicating the presence of past pollution, apparently received from the nearby privies. The total bacterial count is also somewhat high, although no organisms of the B. coli type were isolated from the samples tested.

The bacterial analysis of the Hudson river water shows a high total bacterial count and organisms of the B. coli type in inoculations as small as 1/10 c.c., indicating the presence of considerable amounts of active contamination of animal or human origin.

In view of the above facts, the following conclusions may be drawn:

1. That the regular supply of North Creek is derived from a source which should afford a supply of satisfactory physical and sanitary characteristics.

2. That of the auxiliary supplies the Hudson river is unsafe and unsatisfactory and the pond supply is at present open to active contamination from nearby sources of permanent pollution and by visitors in the vicinity. The auxiliary brook supply, however, should furnish water of a satisfactory sanitary quality.

I would therefore recommend:

1. That the North Creek Water Company take steps to more adequately develop the present regular supply by the construction of proper intake works which would prevent the clogging of the intake pipe by leaves and other foreign material.

2. That if the pond in the southern part of the village be retained as an auxiliary supply, steps be taken to remove all sources of permanent pollution and to forbid all trespassing in its vicinity.

3. That if it is found necessary to retain the auxiliary supply from the brook southwest of the village, more permanent intake works be constructed and the pipe line therefrom laid underground in order that its use may be made more continuous.

4. That the Hudson river be abandoned as a source of auxiliary supply.

5. That if the above sources be insufficient to furnish the required amount of water, steps be taken to develop some other source which would be free from all possible sources of pollution.

I would also recommend that copies of this report be sent to the North Creek Water Works Company and to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July* 3, 1917

REPORT OF WATER ANALYSES FOR NORTH CREEK

Source		Tap in village	Pond, Auxiliary supply	Hudson river at intake
Collected on		4/21/17	4/21/17	4/21/17
Color		5	3	.....
Odor, hot		1 v.	1 v.	.....
Odor, cold		2 v.	2 v.	.....
Turbidity		Tr.	Tr.	.....
Solids, total		23	50	.....
Loss on ignition		11	15	.....
Mineral residue		12	35	.....
Ammonia, free		.006	.023	.....
Ammonia, albuminoid		.037	.071	.....
Nitrites		Tr.	Tr.	.....
Nitrates		Tr.	Tr.	.....
Oxygen consumed		4.2	2.9	.....
Chlorine		0.375	2.25	.....
Hardness, total		12.7	20.2	.....
Alkalinity		6	14	.....
Bacteria per c.c.		3,000	375	3,200
B. coli type	10 c.c.	0+3—	0+3—	3+0—
	1 c.c.	0+3—	0+3—	3+0—
	1/10 c.c.	0+3—	0+3—	2+1—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

NUNDA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Nunda, made by Mr. C. M. Baker, assistant engineer, on August 3, 1917.

Nunda is an incorporated village of 1,140 inhabitants located in the southwestern corner of Livingston county on the Rochester Division of the Pennsylvania railroad, 75 miles south of Rochester. It is on the Keshequa creek, a tributary to Canaseraga creek and the Genesee river. No sewerage system is provided in the village, the houses being served by privies, cesspools, etc.

The water supply was installed, owned and operated by the Nunda Water Works Company until August 1, 1917, at which time it was purchased and taken over by the municipality. The supply was first put into operation about 1887, since when an additional spring has been added to the regular supply, also a second spring and pump station as an auxiliary supply. The regular supply is derived from 2 springs known as the Bradley and Sager springs, located 2½ and 4 miles respectively south of the village. From these springs the water flows by gravity to a storage reservoir on the hill about 1 mile south of the village, thence to the distribution system. The auxiliary supply is pumped into the distribution system from a spring located in the southern edge of the village.

About 50 per cent of the population are served with the water, there being in all some 150 service taps. The distribution system consists of about 7 miles of mains ranging from 4 to 12 inches in diameter. From springs to reservoir and part way from reservoir to village the pipe line is of wood. The normal pressure is 50 pounds per square inch, but this may be increased to 80 pounds in case of fire. Due to lack of meters or other method of measuring the water used, no definite information could be obtained regarding the consumption.

The storage reservoir is constructed of stone and concrete, is 40 by 50 feet in plan by 12 feet deep and has a capacity of about 180,000 gallons. It has been the practice of the water company in the past to clean the reservoir yearly and to flush the mains twice each year. The pumping equipment in connection with the auxiliary supply consists of a Snow steam pump, which is operated as needed.

The Sager spring is located just east of the Pennsylvania railroad, at a point 4 or 4½ miles south of the village. It consists of a small intake basin located in low land near a brook. Ground water flows into this basin from an open collecting gallery. The surface watershed tributary to this spring is probably 25 or 30 acres in area. The village owns about 3 acres, which is enclosed by a fence but no adequate provision is made to prevent surface wash from finding its way into the supply. There are no houses in the vicinity, the watershed being used as pasture land.

The Bradley spring consists of a system of collecting tile, located in a ravine, which collects the water and discharges it into a reservoir. The greater part of the ravine is enclosed by a fence, and drainage ditches are provided around its perimeter to divert surface wash. These ditches, however, were filled in in some places at the time of the inspection, and in some instances they are located outside of the enclosed area.

The spring from which the auxiliary supply is derived is located on low ground belonging to the former owner of the supply just below a small dam across one branch of Keshequa creek. At times of high water this spring is doubtless subject to surface wash.

Some difficulty was experienced in obtaining definite information regarding this supply. Various village officials were interviewed and apparently know little or nothing about the supply, but information was finally obtained from Mr. O. J. Willard, former owner of the system. The assistant engineer was informed that the village contemplates some improvements of the supply. No definite information, however, could be obtained as to the extent or nature of these improvements.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with previous analyses are recorded in the appended table.

The results of these analyses show a water at times slightly colored and turbid, also a water high in hardness. The figures for nitrogen in its various forms are moderate but those for nitrates and chlorine appear to be somewhat above normal. The bacterial counts are usually high and at times are very high. These counts may, however, be due in part to delay in transit, 3 days elapsing from the time the samples were collected at the time of the inspection until they were received at the laboratory. Colon bacilli are prevalent in the 10 c.c. inoculations, frequently present in the 1 c.c. and occasionally in the 1/10 c.c. inoculations, thus indicating the presence of active contamination. This pollution is probably due to surface wash finding its way into the various sources of supply.

As a result of this investigation it may be concluded:

1. That the water supply of Nunda is derived from sources which are subject to pollution by surface wash.

2. That with proper development these sources of supply could probably be made satisfactory with respect to quality and the yield could undoubtedly be increased.

In view of the above I beg to recommend:

1. That a larger area of land be obtained about the Sager spring and that the spring be protected from surface wash by suitable drainage ditches located within the enclosed area.

2. That the drainage ditches be reconstructed about the Bradley spring so as to more adequately divert the surface wash and that they be located inside of the enclosed area or that the area be extended to include the ditches.

In order to secure the most satisfactory development of the supply it seems advisable that the municipality secure the services of a competent consulting expert to make a detailed study of the situation and advise as to the proper procedure in the development of the supply, both with respect to protecting its sanitary quality and to securing a larger yield from the various sources.

Finally I would recommend that copies of this report be sent to the various officials of the municipalities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 17, 1917

REPORT OF WATER ANALYSES FOR NUNDA

Source	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Collected on	2/21/12	4/1/12	10/2/12	11/25/12
Color	10	10	Tr.	Tr.
Odor, hot	.....	.....	.....	.....
Odor, cold	.....	.....	.....	.....
Turbidity	20	30	Cl.	Cl.
Solids, total	158	156	218	182
Loss on ignition	.....	.....	.....	.....
Mineral residue	137	136	186	167
Ammonia, free	.012	.016	.004	.008
Ammonia, albuminoid	.056	.062	.008	.022
Nitrites	tr.	.001	.001	Tr.
Nitrates	0.90	1.08	0.60	0.80
Oxygen consumed	1.70	2.40	0.90	0.70
Chlorine	1.50	1.50	2.50	3.00
Hardness, total	117.2	11.4	160.0	157.2
Alkalinity	116.0	96.0	145.0	145.0
Bacteria per c.c.	6,200	23,000	6,000	500
B. coli type 10 c.c.	+	+	—	—
B. coli type 1 c.c.	+	+	—	—
B. coli type 1/10 c.c.	—	—	—	—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v vegetable.

REPORT OF WATER ANALYSES FOR NUNDA

Source	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Collected on	1/13/13	4/18/13	6/6/13	12/18/14	12/18/14
Color	10	10	15	Tr.	.....
Odor, hot	.....	.....	.....	.....	.....
Odor, cold	.....	.....	.....	.....	.....
Turbidity	5	10	3	Cl.	.....
Solids, total	157	199	179	180	.....
Loss on ignition	.....	.....	.....	.....	.....
Mineral residue	.....	.....	.....	156	.....
Ammonia, free	.008	.010	.010	.002	.....
Ammonia, albuminoid	.054	.034	.038	.002	.....
Nitrites	Tr.	Tr.	Tr.	.001	.....
Nitrates	0.72	1.00	0.60	1.00	.....
Oxygen consumed	1.50	2.25	1.40	0.60	.....
Chlorine	2.00	1.90	2.25	2.50	.....
Hardness, total	125.8	148.8	125.8	140.0	.....
Alkalinity	113.0	143.0	125.0	139.0	.....
Bacteria per c.c.	8,300	200	350	60	40
B. coli type 10 c.c.	+	—	+	—	—
B. coli type 1 c.c.	+	—	+	—	—
B. coli type 1/10 c.c.	—	—	—	—	—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

REPORT OF WATER ANALYSES FOR NUNDA

Source	Water used on Penn. R. R.	Tap, depot	Tap, at Dr. Brown's	*Reservoir public supply
Collected on	12/20/16	1/5/17	1/5/17	8/3/17
Color	7	.....	.....	5
Odor, hot	1 v.	.....	.....	0
Odor, cold	1 v.	.....	.....	0
Turbidity	3	.....	.....	Tr.
Solids, total	179	.....	.....	.....
Loss on ignition	.....	.....	.....	.....
Mineral residue	155	.....	.....	.....
Ammonia, free	.020	.....	.....	.034
Ammonia, albuminoid	.014	.....	.....	.040
Nitrites	.050	.....	.....	.001
Nitrates	0.30	.....	.....	0.70
Oxygen consumed	1.60	.....	.....	1.40
Chlorine	4.00	.....	.....	3.00
Hardness, total	114.2	.....	.....	140.0
Alkalinity	110.0	.....	.....	135.0
Bacteria per c.c.	.....	10	10	200
B. coli type 10 c.c.	.....	—	—	3+0—
B. coli type 1 c.c.	.....	—	—	1+2—
B. coli type 1/10 c.c.	.....	—	—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

* Samples three days in transit.

REPORT OF WATER ANALYSES FOR NUNDA

Source	*Sager spring supply	*Bradley spring supply	*Spring auxiliary supply
Collected on	8/3/17	8/3/17	8/3/17
Odor, hot	.....	1 a	.....
Odor, cold	.....	.....	.....
Ammonia, free	.....	.002	.....
Ammonia, albuminoid	.....	.016	.....
Nitrites	0	0	.....
Nitrates	.....	1.60	.....
Oxygen consumed	.....	0.80	.....
Chlorine	.....	10.0	.....
Hardness, total	.....	245.6	.....
Alkalinity	.....	205.0	.....
Bacteria per c. c	22,500	85,000	5,300
B. coli type 10 c.c.	3+0—	3+0—	3+0—
B. coli type 1 c.c.	1+2—	3+0—	3+0—
B. coli type 1/10 c.c.	0+3—	2+1—	1+2—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.
* Samples three days in transit.

OAKFIELD

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Oakfield, made by Mr. C. M. Baker, assistant engineer, on October 3, 1916.

Oakfield is an incorporated village of 1,307 inhabitants, located in the north central part of Genesee county. It is on the West Shore railroad, about 34 miles west of Rochester and 6 miles northwest of Batavia. No sewer system is provided in the village, the houses being served by privies, cesspools, etc.

The supply is owned by the municipality and was first put into operation about January 1, 1916. Water is obtained from a spring or shallow well located about one-fourth of a mile west of the village just outside the corporation line. Water is pumped from the well through the distribution system into an elevated tank located in the northwestern portion of the village. About 40 per cent of the population is served with the water, there being in all about 100 service taps, all of which are metered. According to the pump records the consumption averages about 30,000 gallons daily, except during a part of the month of August, when a large canning factory was in operation during the last summer, when the daily consumption was approximately 186,000 gallons. The pressure in the village averages 50 to 70 pounds per square inch. The reservoir is located in the northwesterly corner of the village on a tower about 100 feet high and has a capacity of about 125,000 gallons.

The pumping equipment is housed in a brick building, 20 by 30 feet in plan situated directly over the well. The equipment consists of a 15 horsepower electric motor, directly connected with a Deming triplex single-acting pump, having a capacity of 250,000 gallons per day, also a 24 horsepower gasoline engine, directly connected with a similar pump. An electrical connection with the standpipe automatically starts the motor when the standpipe is half empty, the current being automatically shut off when the tank is full.

The well or spring from which the supply is derived was formerly known as the Seymour spring. It is located near a small stream at the foot of a steep bank. Measurement of the flow of the spring made in April, 1915, before

the construction of the well, showed a yield of 250,000 gallons per day, and similar measurements in June of the same year showed a yield of 175,000 gallons daily. A well or reservoir 18 by 28 feet in plan and 10 feet deep has been constructed about the spring. The walls of this well are of concrete and rest on the limestone formation from which the water is obtained. The floor of the pumping station, which is directly over the well, appears to be watertight and was in a satisfactory condition at the time of the inspection. About four acres of land are owned by the village in the immediate vicinity of the well. This area was formerly low and at times became flooded, but since the construction of the well it has been filled in with soil from the nearby bank, so that there now appears to be little if any danger of inundation. Openings in the west wall of the well, however, allow water from the well to discharge below the overflow provided for this purpose. It is possible also that under certain conditions at flood time, surface water may find its way into the supply back through these openings. No insanitary conditions were observed in the immediate vicinity of the well at the time of the inspection.

Bacterial analyses of the water submitted by the village authorities to the Conservation Commission before the supply was put into operation were not entirely favorable. Apparatus was, therefore, provided for sterilizing the water with liquid chlorine. This apparatus consists of a Wallace & Tiernan solution feed, type "A," manual control apparatus. The superintendent in charge of the plant apparently had had little instruction regarding the operation of the chlorine apparatus. At the time of the inspection the apparatus was clogged in some part, either in or beyond the control valve, so the chlorine was not then being applied to the water. The chlorine cylinder was very nearly empty and no provision had been made for obtaining another. No scales are provided for checking the apparatus by the actual loss of weight in the chlorine cylinder. Although, as previously stated, no insanitary conditions were observed in the vicinity of the well, in view of the unsatisfactory bacterial results previously obtained, more careful supervision should be maintained over the operation of the liquid chlorine apparatus.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity, but one that is exceedingly hard. While the hardness of the water does not affect its sanitary quality, it is a matter for serious economic consideration, and it also causes considerable inconvenience to the consumers. This difficulty, however, could doubtless be overcome by the installation and operation of a suitable softening plant.

The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low but those for nitrates and chlorine are rather high, thus indicating that pollution finds its way into the ground water tributary to the supply. The bacterial counts were low in all cases and colon bacilli were not found present.

As a result of this investigation it may be concluded:

1. That although otherwise satisfactory from a physical standpoint, the water is exceedingly hard.
2. That although bacterial analyses of the spring water before the supply was developed were not entirely favorable, the location and development of the present source of supply indicate that there is little danger of pollution except as pointed out above, that which might arise from surface water finding its way into the well through openings in the west wall at time of floods.
3. That the liquid chlorine plant was not being properly supervised and operated at the time of the inspection in that
   (a) The superintendent was not sufficiently informed regarding the operation of the apparatus, with the result that clogging of the apparatus had occurred and remained uncorrected at the time of the inspection.

(b) No scales are provided to check the operation of the apparatus by the loss of weight in the chlorine cylinder.

(c) An extra cylinder of chlorine was not on hand to replace the one connected with the apparatus when it should become empty.

In view of the above I beg to offer the following recommendations to be acted upon by the village authorities:

1. That the openings in the west wall of the well be tightly closed in order to prevent the possibility of surface wash finding its way into the well.

2. That, in view of the pollution indicated by analyses made before development of the supply, the chlorine plant be carefully operated until such time as subsequent analyses, covering a proper period of time and various seasons of the year, indicate a satisfactory quality of raw water. In this connection the superintendent should be fully informed regarding the plant, scales should be provided to check the rate of application of chlorine and the operation of the apparatus and extra chlorine should at all times be on hand.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 29, 1917

REPORT OF WATER ANALYSES FOR OAKFIELD

Source	Raw water	Tap at pump sta.	Tap in village	Tap in village
Collected on	10/3/16	10/3/16	10/3/16	12/20/16
Color	.....	.....	.....	Tr.
Odor, hot	.....	.....	.....	1 v.
Odor, cold	.....	.....	.....	1 v.
Turbidity	.....	.....	.....	Cl.
Solids, total	.....	.....	.....	1,297
Loss on ignition	.....	.....	.....	127
Mineral residue	.....	.....	.....	1,170
Ammonia, free	.....	.....	.....	.006
Ammonia, albuminoid	.....	.....	.....	.010
Nitrites	.....	.....	.....	.006
Nitrates	.....	.....	.....	0.70
Oxygen consumed	.....	.....	.....	1.60
Chlorine	.....	.....	.....	9.75
Hardness, total	.....	.....	.....	829.0
Alkalinity	.....	.....	.....	220.0
Bacteria per c.c.	40	30	10	.....
B. coli type, 10 c.c.	0+3—	0+3—	0+3—	.....
B. coli type, 1 c.c.	0+3—	0+3—	0+3—	.....
B. coli type, 1/10 c.c.	0+3—	0+3—	0+3—	.....

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

OLEAN

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to sumbit the following report upon the sanitary condition of the public water supply of Olean, covering both the present supply and a proposed new supply.

General information regarding present supply

Location.— Cattaraugus county, on Erie railroad and the Buffalo division of the Pennsylvania railroad, also on the Allegany river.

Population.— 17,925.

Waterworks in charge of.— Board of water commissioners.

Source of supply.— Driven wells in low land adjacent to Allegany river in southern part of the city.

Consumption.— 2,000,000 gallons per day, or 111 gallons per capita.

Distribution system.— Water is pumped from wells to storage reservoir, whence it flows by gravity through a distribution system consisting of 47 miles of 4 to 24-inch pipe.

Service taps.— 4,500, all of which are metered.

Pressure.—110 pounds per square inch.

Storage.—Two reservoirs, one 8,000,000 and the other 2,000,000 gallons capacity.

Purification.— None.

References to previous investigations.— Page 250, 30th Annual Report; page 947, 33d Report and page 519, 36th Report.

The preceding reports have pointed out that the present supply is subject to pollution at such times as the Allegany river overflows the area about the wells from which the supply is obtained. It has also been pointed out that there was danger of pollution from a privy located not far from a dug well tributary to the supply. As a result of these insanitary conditions the following recommendations were made in the last preceding report:

1. That the board of water commissioners take immediate steps to prevent possible contamination of the water supply.
   a. By carefully protecting each well from the possibility of leakage of surface water into it.
   b. By flood control methods in accordance with the recommendations of the previous reports.
2. That the board of water commissioners remove the privy near the Cook well to a distance of at least 500 feet from the well, or else provide it with water-tight containers, the contents of which shall be systematically removed and properly disposed of.
3. That the city authorities have regular and frequent analyses made of the supply, in order to detect at any time the presence of active contamination.
4. That, in case the analyses, after the carrying out of the improvements of recommendation No. 1, show that these measures are ineffective to prevent contamination, the board of water commissioners consider abandoning the wells and securing a new supply of unquestioned sanitary quality or else, if practicable, install apparatus for the sterilization of the supply with liquid chlorine.

As a result of this investigation it is apparent that the city authorities have endeavored to secure the carrying out of these recommendations. The privy located near the "Cook" well has been removed and sewers installed. Analyses of the water have been frequently made. Furthermore, plans are now being prepared for the development of a new supply by purification of the water from Olean creek. No steps have been taken, however, to prevent overflooding of the wells. In fact, as a result of excavating directly over the wells for the construction of dykes in connection with flood prevention in the city, the possibility of pollution from the river is greater than at the time of previous inspections. At the time of the recent inspection the area about all of the driven wells was flooded and the inspector was informed that such a condition had existed for a month or more prior thereto.

During the past few years it has been necessary to draw upon these wells to their full capacity in order to furnish sufficient water; in fact, during the past winter it was necessary to shut off some of the largest consumers for about three weeks because of a shortage of water. The necessity of a more adequate supply was, therefore, apparent and as stated above, plans are now being prepared for the development of a new supply. In connection with the development of this new supply from Olean creek, it is proposed to take the water from the creek near the northern edge of the city, just below the Erie railroad bridge. The water is to be treated with alum and passed through a coagulating basin, thence through gravity mechanical filters into a clear water

well. Sterilization is to be provided by means of liquid chlorine before the water enters the clear water well. The plans for this proposed plant were in the course of preparation at the time of the inspection, the general lay-out having been practically decided upon, but the details not having been completed.

The area of the watershed of Olean creek above the proposed intake is about 170 square miles, and the population is equivalent to about 36 persons per square mile. The land is used principally for farming and agricultural purposes. There are two incorporated villages located on the bank of streams tributary to the creek. One, Franklinville, has a population of 2,065, and is provided with a sewer system and disposal plant, the effluent from which discharges into the stream. Cuba, the other village, is located on a tributary of the creek and has a population of 1,645. It is not provided with a sewer system and, so far as could be determined by the inspection, no sewers discharge into the stream at this place.

An inspection of the watershed at the time of this investigation showed the following insanitary conditions which may be considered as indicative of the general conditions on the watershed:

1. At Ischua, about 12 miles above the proposed intake on property of the Baxter estate, the toilet from a house discharges into a small tributary that finds its way into the creek about 300 feet distant. A privy is also located on the bank of this tributary.
2. At the farm of Edward Anderson, 1 mile above Ischua, or 13 miles above the intake, a privy is located on the bank of a tributary.
3. At a farm 3 miles above Ischua, or 15 miles above the intake, a privy with no vault is 100 feet from the stream.
4. At the farm of Leo Reed, 1½ miles south of Franklinville, or about 28 miles above the intake, a privy is located on the bank of the stream.

These insanitary conditions if allowed to exist would constitute a serious menace to the sanitary quality of the proposed supply. By the enactment of rules and regulations by this Department, however, these conditions could probably be satisfactorily controlled.

The proposed purification plant is to have a capacity of about 2,000,000 gallons per day, which is that of the present consumption. The present supply is to be held in reserve and used in connection with this supply if necessary. The coagulating basin, which is to be divided into two parts, is to have a total detention period of about four hours. There are to be 6 filter units, each 11 feet by 13 feet 6 inches, thus giving a total filter area of about .02 of an acre and providing for a rate of filtration of about 100,000,000 gallons per acre per day. Provision is to be made for a rapid wash without agitation, the wash water to rise at a rate of 3 feet per second, an equivalent of about 22 gallons per square foot of filter surface. The walls of the waste water gutters are to be 2 feet above the surface of the sand. Arrangement is to be made for filtering to waste after washing. From the filters the water will pass into the clear water well, which will be located beneath the filters. Liquid chlorine will be applied to the effluent from the filters before it enters the clear water well.

Samples of the present supply and of Olean creek water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of other analyses made since the preceding investigation are recorded in the appended table.

The results of these analyses indicate that the water of the present supply is satisfactory with respect to color and turbidity, but that it is very hard. The bacterial counts are occasionally high and in the samples collected at the time of this investigation colon bacilli were somewhat prevalent, thus indicating the presence of active and potentially dangerous contamination. This pollution was probably due to the overflowing of the land about the driven wells.

The result of the analyses of the samples collected from Olean creek show clearly the contaminated condition of this water, and that at the time of the

inspection it was high in color and turbidity. This water, however, is decidedly less hard than the present supply, and with proper purification should be satisfactory with respect to both physical and sanitary qualities.

As a result of this investigation it may be concluded:

1. That regarding the present supply,
   (a) As pointed out in previous reports, it is subject to intermittent pollution, due to overflowing of the land in the vicinity of the wells.
   (b) The wells do not furnish an adequate supply of water for the present needs of the city.
2. That although the water of Olean creek is subject to considerable contamination this water can undoubtedly be satisfactorily purified to furnish a satisfactory supply, providing:
   (a) Proper sanitary conditions are maintained on the watershed.
   (b) The purification plant is properly designed and constructed.
   (c) That, after being constructed, the plant is continuously and efficiently operated.

As a result of the above, I beg to offer the following recommendations to be acted upon by the city officials.

1. That apparatus be provided and the present supply be sterilized with liquid chlorine.
2. That in connection with the development of the new supply,
   (a) Application be made to this Department for the enactment of rules and regulations protecting the sanitary quality of the supply.
   (b) That care and proper supervision be at all times maintained in order that the new purification plant be effectively operated after its completion.
   (c) In view of the possibility of pollution finding its way directly to the supply from toilets on trains, if the intake is located just below the Erie railroad bridge, it is recommended that the intake be located above this bridge.

Finally, I would recommend that copies of this report be sent to the various city officials, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 8, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			Bacteria per c.c.; gelatin 20°, 48 hours	B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
Olean	Cattaraugus	Tap, public supply	5/20/15					208		193	.006	.006	.001	1.20	0.80	11.63	156.0	149.0	35	—	—	—
Olean	Cattaraugus	Tap, public supply	5/20/15																25	—	—	—
Olean	Cattaraugus	Tap, public supply	4/18/16	8	3	1 v.	1 v.	180	18	162	.022	.074	.003	0.08	2.20	11.00	125.8	125.0	70	—	—	—
Olean	Cattaraugus	Tap, public supply	5/16/16																25	—	—	—
Olean	Cattaraugus	Tap, public supply	5/16/16													5.00			15	—	—	—
Olean	Cattaraugus	Tap, public supply	8/24/16	5	Tr.	1 v.	1 v.				.018	.014	.002	0.40	1.10	12.50	188.5	143.0	1,200	—	—	—
Olean	Cattaraugus	Tap, public supply	9/19/16																1,500	—	—	—
Olean	Cattaraugus	Tap, public supply	9/19/16																5	—	—	—
Olean	Cattaraugus	Tap, public supply	9/19/16																1,100	—	—	—
Olean	Cattaraugus	Tap, public supply	11/19/16																40	—	—	—
Olean	Cattaraugus	Tap, public supply	2/ 7/17																10	—	—	—
Olean	Cattaraugus	Tap, public supply	2/ 7/17	Tr.	Cl.						Tr.	0.03	0.03	0.18	0.50	11.2	136.0	147.0	35	—	—	—
Olean	Cattaraugus	Tap, public supply	6/ 6/17																10	—	—	—
Olean	Cattaraugus	Tap, public supply	6/ 6/17																*24,000	1+2—	0+3—	0+3—
Olean	Cattaraugus	Tap, city hall	7/12/17	0	Tr.	1 v.	1 v.				.004	.028		0.30	1.90	11.75	148.6	146.0	100	2+1—	0+3—	0+3—
Olean	Cattaraugus	Tap at pump station	7/12/17																3,300	3+0—	1+2—	1+1—
Olean	Cattaraugus	Olean creek proposed supply	7/12/17	30	25	1 e.	1 e.				.030	.130	.004	0.20	4.20	2.00	47.1	41.0	3,200	3+0—	3+0—	3+0—

* Delayed in transit.

ORISKANY FALLS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the sanitary condition of the public water supply of Oriskany Falls, made by Mr. C. M. Baker, assistant engineer, on July 24, 1917.

General information

Location.— Southwestern part of Oneida county, 18 miles southwest of Utica, on the Utica division of the New York, Ontario and Western railroad.

Population.— 973, 65 per cent of which is served with the water.

Source of supply.— Impounding, spring fed reservoir, 1½ miles southwest of the village.

Consumption.— No definite information, possibly 100,000 gallons per day.

Distribution system.— Gravity system. Six miles of mains, 6 inches to 12 inches in diameter.

Service taps.— 110, 10 of which are metered.

Pressure.— 70 to 80 pounds per square inch.

Storage.— Impounding reservoir, 13,000,000 gallons capacity.

Purification.— None.

References to previous investigations.— 35th Annual Report, page 381.

At the time of the previous investigation, in 1914, it was pointed out that under certain conditions there was possibility of pollution of the water in the reservoir, also that there was danger of contamination of the supply by pumping water from Oriskany creek as an auxiliary fire supply into the distribution system. Furthermore, it was found that trouble was at times experienced, due to disagreeable tastes and odors in the water.

In view of the above the following recommendations regarding protecting the sanitary quality of the supply were then made:

1. That in case of further occurrence of disagreeable tastes and odors the village authorities consider the adaptability of the following remedial measures:
   (a) The removal of organic deposits from the bottom and sides of the reservoir.
   (b) The covering of pockets of organic deposits with clean gravel.
   (c) The aeration and filtration of the water.
2. That in order to reduce the danger of wilful or accidental pollution of the water supply to a minimum, notices be posted prohibiting trespassing and, during the highway construction in the vicinity, the village maintain a patrol of the water supply.
3. That in order to reduce to a minimum the possibility of the use of the creek water as a supplementary supply the village should put the reservoir into the best possible condition to maintain its maximum storage capacity. In case it should be found impossible to bring about this improvement the village should consider the installation of separate fire mains from the auxiliary pump to strategic points for fire protection. As previously pointed out, only in case of fire emergency should the polluted creek water enter the village mains and should such an emergency occur, the extraordinary precaution as outlined before should be carefully carried out.

Recently there has been some correspondence regarding the location of a cemetery near the reservoir, this matter being brought to the attention of the Department by Dr. G. J. Pollard, health officer. In our letter to the health officer in reply to a communication from him dated June 20, 1917, it was suggested that the board of water commissioners make application to this Department for the enactment of rules and regulations protecting the sanitary quality of the supply.

As a result of the present investigation it appears that none of the recommendations either of the previous report or the letter mentioned above have

been carried out, although there have been some changes made in the supply.

Since the previous investigation two of the principal springs tributary to the supply have been directly connected with the intake well so as to deliver water directly into the distribution system, thus eliminating the effect of algae growth in the reservoir. It is apparent, however, that the water from these springs is not sufficient to meet the present demand, since at certain seasons of the year the taste and odor frequently occur in water drawn from taps in the village. In connection with the construction of the state road along the eastern shore of the reservoir the ditches formerly provided for diverting surface wash were filled or destroyed, and have not yet been reconstructed. There is considerable opportunity for surface wash to find its way into the reservoir directly from the road. Furthermore, the ditch near the northeastern corner of the reservoir had become practically filled, and there appears to be considerable danger of pollution by drainage from pasture land in this vicinity. In fact it is apparent that adequate maintenance of these drainage ditches has not been provided.

The cemetery concerning which there has been correspondence as mentioned above, is located on the hill northeast of and on the opposite side of the road from the reservoir, the nearest point of the cemetery being about 500 feet from the reservoir. The topography is such, however, that there is no possibility of surface drainage from the cemetery finding its way into the reservoir, nor does it appear probable that the flow of the ground water would in any case be from the cemetery toward the reservoir. So far as could be determined by this inspection, therefore, there is no danger of pollution of the public water supply from this source. If, however, the cemetery should be extended to the southeast or nearer the reservoir, there would probably be danger of pollution of the ground water tributary to the water supply. It seems, therefore, that rules and regulations for the sanitary protection of the supply should be enacted in order that the village may have more effective control of conditions in the vicinity of the reservoir and on the watershed.

There was a very active growth of organic matter in the reservoir at the time of the inspection. A sample of this was collected and examined under the microscope and found to consist of pond weed and large numbers of algæ of various species, a number of which might, under favorable conditions, cause disagreeable tastes and odor in the water. The growth of these organisms is undoubtedly due largely to the organic matter present in the reservoir.

Samples of water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of the analyses of samples collected from a tap in the village show a water satisfactory in physical qualities with respect to color and turbidity. The figures for nitrogen in the form of free and albuminoid ammonia are low, but those for nitrates and chlorine are somewhat high, thus indicating that some pollution finds its way into the ground water tributary to the supply. The bacterial counts were high in the samples collected both from a tap in the village and from the reservoir, and furthermore, colon bacilli were found present in the sample collected from the reservoir, thus indicating the presence of active contamination. It is quite probable that this pollution is due to surface wash from the road and pasture land, the possibility of which has been pointed out above.

As a result of this investigation it may be concluded:

1. That the recommendations of the previous report have not been carried out.
2. That due to the filling in or elimination of the drainage ditches about the reservoir, the supply is now subject to direct pollution by surface wash from roads and pasture land.
3. That, although there appears to be no danger of pollution of the supply from the cemetery as now located, should this cemetery be extended further to the south it might constitute a menace to the sanitary quality of the supply.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That the recommendations of the previous report as recorded elsewhere in this report be carried out.

2. That if it appears impractical or impossible for the village to eliminate the trouble from algae in the manner mentioned above, consideration be given to the treatment of the supply with copper sulphate, in order to eliminate this trouble.

3. That the village authorities make application to this Department for the enactment of rules and regulations protecting the sanitary quality of the supply, in order that more effective control may be placed upon the sanitary conditions in the vicinity of the reservoir.

Finally, I would recommend that copies of this report be transmitted to the various local officials, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 20, 1917

REPORT OF WATER ANALYSES FOR ORISKANY FALLS

Source		Tap in village	Reservoir
Collected on		7/24/17	7/24/17
Color		0	.....
Odor, hot		1 v.	.....
Odor, cold		1 v.	.....
Turbidity		0	.....
Ammonia, free		.006	.....
Ammonia, albuminoid		.016	.....
Nitrites		0	.....
Nitrates		1.0	.....
Oxygen consumed		0.3	.....
Chlorine		2.25	.....
Hardness, total		245.6	.....
Alkalinity		230.0	.....
Bacteria per c.c.		12,000	1,900
B. coli type	10 c.c.	0+3—	1+2—
	1 c.c.	0+3—	1+2—
	1/10 c.c.	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

OTSEGO COUNTY TUBERCULOSIS HOSPITAL

(Plans for Water Supply and Sewage Disposal; see sec. I-a, p. 112)

OXFORD

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the sanitary condition of the public water supply of Oxford, made by Mr. C. M. Baker, assistant engineer, on April 11 and 12, 1917.

General information

Location.— Chenango county, on D. L. & W. and N. Y. O. & W. railroads, 35 miles northeast of Binghamton.

Population.— 1,594, 70 per cent of which is served with the water.

Source of supply.— Present supply, springs 5 miles north of the village. Proposed auxiliary supply, well in northern edge of the village.

Consumption.— Estimated at 90,000 gallons daily, or 81 gallons per capita per day.

Distribution system.— Ten miles of mains, from 4 to 10 inches in diameter.

Taps.— 309, all of which are metered.

Pressure.—Approximately 90 pounds per square inch in main part of village.

Storage.— Masonry reservoir, 252,000 gallons capacity.

Purification.— None.

Reference to previous report.— Report on previous investigation of this supply was transmitted under date of October 9, 1916.

At the time of the previous investigation the supply was apparently in good condition and the only recommendation then made, therefore, was regarding the maintenance of the satisfactory conditions then existing. Since this previous investigation, however, some improvements have been made to the supply. New houses of more substantial construction have been built over the springs and the area about the main group of springs has been covered with concrete, and ditches have been provided to better protect them from surface wash. It is apparent that the sanitary condition of the present supply is still satisfactory and that the village authorities are exercising careful supervision in order that these conditions may be maintained.

Although no serious shortage has occurred in connection with the present supply, it is feared that at times sufficient water may not be available. A well has, therefore, been recently drilled in the northern edge of the village to furnish an auxiliary supply. It is proposed to pump water from this well into the distribution system when necessary, although the pumps are not yet provided and the well is not connected up. The well is located on the bank of a small stream, near Grant street, in the northern edge of the village. It is a drilled well 6 inches in diameter and 300 feet deep. The strata consist of drift gravel for a distance of about 40 feet, then blue sandstone to a depth of about 285 feet, the remainder of the depth being through red sandstone which is the water bearing stratum. A small amount of water was obtained at a depth of about 200 feet, but the greater portion of the flow, which is estimated at 20 gallons per minute, is derived from the lower level. The well driller informed the engineer that a saline stratum underlies this section at a depth of about 25 feet below the bottom of the well, and that further drilling was, therefore, not deemed advisable.

A residence and a barn are located about 200 feet from the well and within 500 feet are some 7 houses, and within about 1,000 feet and beyond this distance are 14 or 15 houses. There appears, however, to be no opportunity for direct contamination of the well water from these premises, due both to the contour of the ground and the strata through which the well is drilled.

Containers had not arrived at the time of the inspection for the collection of samples. Samples were collected later, however, by Dr. Hall, health officer, and sent to the Division of Laboratories and Research for analysis, the results of which are recorded in the appended table.

The results of the analysis of the sample from the regular supply show low figures for nitrogen in its various forms, also a low bacterial count and the absence of colon bacilli, thus indicating that no active contamination was present at the time of the inspection.

The results of the analysis of the well water show a water turbid at the time of the collection, probably due, however, to the fact that the well has not been pumped out. The figures for nitrogen in its various forms are low, and although the figure for chlorine is rather high, this is probably due to saline deposits. The bacterial count was low and colon bacilli were not found present. It appears, therefore, that this supply is of a satisfactory sanitary

quality, and that if proper sanitary conditions are maintained in the vicinity of the well a water satisfactory for potable purposes should be obtained.

As a result of this investigation it may be concluded:

1. That the village authorities appear to be exercising proper care in order to maintain the regular water supply in a proper sanitary condition.

2. That the new well, which it is proposed to use as an auxiliary supply, although located comparatively close to a number of buildings, will probably furnish a satisfactory supply of water providing proper sanitary conditions are at all times maintained in its vicinity.

In view of the above, I beg to offer the following recommendations to be acted upon by the village officials:

1. That the present careful supervision of the regular supply be maintained.

2. That with the development of the new well as an auxiliary supply, no privy with earthen vaults or leaching cesspools be allowed within a radius of 500 feet, it thus being necessary to provide all privies or cesspools within this area with water tight containers.

Finally I would recommend that copies of this report be sent to the water commissioners of Oxford, to the local health officer, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 31, 1917

REPORT OF WATER ANALYSES FOR OXFORD

Source	Tap, Dr. Hall home	Well
Color	Cl.	2
Odor, hot	1v.	1 a.
Odor, cold	2 a.	2 a.
Turbidity	Tr.	15
Ammonia, free	.007	.081
Ammonia, albuminoid	.002	.080
Nitrites	Tr.	Tr.
Nitrates	Tr.	Tr.
Oxygen consumed	.20	.90
Chlorine	3.75	9.00
Hardness, total	41.0	43.7
Alkalinity	37.0	.....
Bacteria per c.c	45.0	35
B. coli type 10 c.c.	—	—
B. coli type 1 c.c.	—	—
B. coli type 1/10 c.c.	—	—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

PAWLING

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon a reinspection of the public water supply of the village of Pawling, made by Mr. M. F. Sanborn, assistant engineer, on April 25, 1917.

General description

Location.—Westchester county, on Harlem division of the N. Y. C. & H. R. R., 64 miles north of New York city.

Population.— 1,050, 90 per cent of which is served with the water.

Waterworks in charge of.— Board of trustees.

Source of supply.— Brook, 3 miles northeast of village.

Consumption.— 95,000 gallons daily.

Distribution system.— Gravity, 8 miles of mains, 4 to 10 inches in diameter.

Service taps.— 175, none of which are metered.

Pressure.— 90 to 120 pounds per square inch.

Storage.— Impounding reservoir, 30,000,000 gallons.

Purification.— None.

Reference to previous investigations.—Annual Report, Vol. 33, page 794.

The previous inspection was made in connection with an investigation of an outbreak of typhoid fever. At that time it was pointed out that general satisfactory sanitary conditions existed upon the watershed of this supply, but that there were several local opportunities for extremely objectionable and possibly dangerous pollution, namely, the direct drainage into the reservoir of washings from pasture land and dressed fields, and the practice of ice cutting on the reservoir. It was, therefore, recommended that the stream tributary to the reservoir be fenced off so as to prevent cattle from entering and polluting the water, and that the spreading of manure on the territory adjacent to the reservoir should be prohibited, or suitable drainage ditches should be constructed in order to divert polluted surface water from entering the reservoir. It was further recommended that the practice of ice cutting be either prohibited or carried on only under the strict supervision of the board of water commissioners, that frequent and regular inspections be made by the water commissioners of the sources of supply and that, should any difficulty be experienced in maintaining satisfactory sanitary conditions upon the watershed, the village authorities apply to this Department for the enactment of rules and regulations.

From the recent inspection it appears that the supply is still open to contamination by surface wash from pasture and cultivated lands, although the practice of ice cutting upon the reservoir has now been prohibited. There is also one house, not mentioned in the previous report, at which there exists certain possibilities of contamination of the supply. This place is located about one-half mile above the intake on the northerly brook. At this place there is a privy about 75 feet from the brook and a barnyard and barn about 60 feet therefrom. With the exceptions noted above the watersheds tributary to the Pawling supply appear to be in a fair sanitary condition for a surface supply.

At times some trouble is experienced with tastes and odors in the water, due to the development of algae growths in the impounding reservoir. It is possible that this trouble might be obviated by the judicious application of copper sulphate to the reservoir.

At the time of the inspection a sample of water was collected from a tap in the village, and the results of the analysis of this sample, together with others made in the past by the Division of Laboratories and Research, will be found in the appended table.

These analyses show a water somewhat colored at times, usually clear, although occasionally turbid and comparatively hard. The figures for nitrogen in its various forms and for oxygen consumed indicate the presence of moderate amounts of decomposing and decomposable organic matter. The total bacterial counts are usually moderate for a surface supply, although at times rather high. Organisms of the B. coli type are present in the majority of the 10 c.c. inoculations and are occasionally present in the 1 c.c. and 1/10 c.c. inoculations, thus indicating the presence at times of considerable active contamination of animal or human origin.

In view of the above facts the following conclusions may be drawn:

1. That the village authorities of Pawling have in part carried out the recommendations made by this Department in 1912.
2. That the supply is, however, still open to animal pollution from pasture land and cultivated fields and possibly to human contamination from the dwellings located upon the watershed and from transient visitors thereto.
3. That the supply is at times subject to tastes and odors, due in all probability to the growth of algae in the impounding reservoir.

I would therefore recommend:

1. That the village authorities give their consideration to the previous recommendations of this Department.
2. That in order to preclude the danger arising from accidental, incidental or wilful pollution of the supply by transient visitors to the watershed or by permanent residents thereon, the village install and properly operate some method for the purification of the supply. In this connection sterilization by liquid chlorine might alone be ample to protect the sanitary quality of the supply, although, in view of the trouble experienced at times with tastes and odors, it might be more advisable to subject the supply to filtration supplemented by aeration.
3. That pending the installation of a permanent purification plant and at such times as trouble from algae growth is experienced, copper sulphate be applied to the water in the impounding reservoir under the advice of a competent expert.
4. That should any difficulty be experienced in removing sources of pollution upon the watershed, the village authorities consider the matter of applying to this Department for the enactment of rules and regulations for the sanitary protection of the supply as provided for by section 70 of the Public Health Law.

I would further recommend that copies of this report be transmitted to the local authorities of Pawling and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 26, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			Bacteria per c.c.; gelatin 20°, 48 hours	B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
Pawling	Dutchess	Tap, public supply	2/23/11	Tr.	Cl.			106		86	.030	.074	.005	0.16	1.50	2.50	77.1	76.0	250	−	−	−
Pawling	Dutchess	Tap, public supply	5/ 9/11	0	Cl.			85		66	.022	.178	.003	Tr.	1.10	2.00	60.0	58.0	20	−	−	−
Pawling	Dutchess	Tap, public supply	6/22/11	5	Cl.			116		86	.014	.066	Tr.	Tr.	2.50	2.25	74.3	63.0	12	−	−	−
Pawling	Dutchess	Tap, public supply	9/20/11	5	Cl.			92		91	.018	.074	.001	0.02	2.90	2.00	80.0	74.0	35	+	−	−
Pawling	Dutchess	Tap, public supply	11/ 9/11	Tr.	Cl.			93		81	.004	.066	.001	0.06	1.90	2.00	80.0	72.0	30	−	−	−
Pawling	Dutchess	Tap, public supply	12/15/11	Tr.	Cl.			97		75	.018	.048	.002	0.16	1.21	2.00	70.0	68.0	300	+	+	−
Pawling	Dutchess	Tap, public supply	1/19/12	5	Cl.			97		82	.020	.028	.001	0.30	1.00	2.00	80.0	73.0	90	+	+	−
Pawling	Dutchess	Tap, public supply	2/ 9/12																280	+	+	+
Pawling	Dutchess	Tap, public supply	2/ 9/12																300	+	+	+
Pawling	Dutchess	Tap, public supply	2/23/12	Tr.	Tr.			108		83	.028	.076	.001	0.26	1.10	2.25	71.4	68.0	1,200	+	+	+
Pawling	Dutchess	Tap, public supply	3/29/12	Tr.	Cl.			63		50	.012	.036	.002	0.14	1.20	2.00	48.6	37.0	150	−	−	−
Pawling	Dutchess	Tap, public supply	5/ 3/12	Tr.	Cl.			69		58	.004	.032	Tr.	0.16	0.90	1.25	48.6	48.0	90	−	−	−
Pawling	Dutchess	Tap, public supply	8/30/12	Tr.	Cl.			95		82	.002	.056	Tr.	0.08	1.80	1.50	74.3	73.0	700	+	+	+
Pawling	Dutchess	Tap, public supply	10/18/12	2	Cl.			110		84	.004	.104	Tr.	0.10	1.80	2.37	80.0	79.0	150	+	−	+
Pawling	Dutchess	Tap, public supply	12/21/12	Tr.	Cl.			90		67	.026	.080	.001	0.16	1.90	1.50	48.6	24.0	11,500	+	+	+
Pawling	Dutchess	Tap, public supply	1/23/13	10	5			99			.040	.080	.002	0.70	2.10	2.75	85.7	59.0	450	+	−	−
Pawling	Dutchess	Tap, public supply	2/27/13	Tr.	Cl.			109			.024	.062	.003	0.70	1.40	2.75	75.7	69.0	60	−	−	−
Pawling	Dutchess	Tap, public supply	4/10/13	2	Cl.			96			.014	.068	.001	0.40	1.80	2.00	68.6	55.0	90	−	−	−
Pawling	Dutchess	Tap, public supply	5/22/13	Tr.	Cl.			84			.010	.032	.001	0.08	0.80	1.75	58.6	56.0	300	+	+	+
Pawling	Dutchess	Tap, public supply	7/ 1/13	17	1			91			.008	.094	.001	0.14	1.60	2.25	70.0	68.0	600	−	−	−
Pawling	Dutchess	Tap, public supply	3/19/14	Tr.	Tr.			88		78	.022	.048	Tr.	0.02	2.40	1.87	67.1	58.0	90	−	−	−
Pawling	Dutchess	Tap, public supply	8/ 9/15	Tr.	Tr.			104		99	.028	.068	Tr.	Tr.	2.10	2.00	81.4	80.0	50	+	−	−
Pawling	Dutchess	Tap, public supply	8/ 9/15	Tr.	20			104		98	.020	.016	.001	Tr.	0.50	3.00	74.0	72.0				
Pawling	Dutchess	Tap, public supply	3/21/17	9	Cl.	1 v.	1 e.				.115	.116	.003	0.02	5.30	2.50	45.7	43.0	210	0+3−	0+3−	0+3−

PEEKSKILL

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of the village of Peekskill, Westchester county, made by Mr. E. S. Chase, assistant engineer, on May 24, 1917.

Peekskill is an incorporated village with a population of 15,502, located on the Hudson river, 40 miles north of New York city, on the main line of the New York Central and Hudson River railroad. The village contains several manufacturing establishments and is largely an industrial community. A public system of sewers discharges without treatment into the Hudson river.

The public water supply of Peekskill is derived after purification from Peekskill Hollow creek, the intake being located about 2 miles northeast of the village center. The waterworks are owned and operated by the municipality and were originally installed in 1875. Changes in pumping equipment, intake works and extensions to the water mains have been made from time to time, and in 1910 four units of slow sand filters were constructed and put into operation. Of the 2,500 services some 90 per cent are metered. The water is pumped from the creek to a storage and sedimentation reservoir on a hill about 1 mile south of the pumping station, whence it flows by gravity through the filter plant to the village. A small amount of filtered water is also pumped to a steel standpipe about half a mile south of the filters, this standpipe serving a separate high service distribution system of small extent. The pressure in the mains varies from 40 to 110 pounds per square inch according to location in the village. The average daily water consumption is approximately 3½ to 4 million gallons daily, about a third of which is used for industrial purposes.

The intake at Peekskill creek consists of a concrete dam approximately 15 feet high and 75 feet long, forming a small intake pond of limited area. From a concrete intake chamber provided with bar screens the water flows to the pumping station a short distance below the dam.

The pumping station is a brick building housing a steam pumping equipment. The pumping equipment consists of one Holley pump with a capacity of 3,000,000 gallons daily, two centrifugal pumps driven by water power with a capacity of 864,000 gallons per day each, and one centrifugal pump, motor driven, with a capacity of 900,000 gallons per day. Of the total amount of water pumped during 1916, some 938,000,000 gallons were pumped by the Holley pump, 22,000,000 gallons by the motor-driven centrifugal pump, 259,000,000 gallons by water power and 120,000,000 gallons by one of the water power pumps driven by a Corliss engine. The high service equipment at the filters is 750,000 gallons per day, motor driven, Worthington centrifugal pump. This pump is usually operated about 1½ hours per day.

The 30,000,000-gallon reservoir into which the water is pumped from the pumping station was formed by cut and fill with earth embankments, rubble paved on the inner slopes. This reservoir acts as both storage and sedimentation basin prior to filtration. From this reservoir the water flows by gravity through a small intake chamber, thence through an aerating nozzle into a circular concrete basin, from which it flows upon the filters.

These filters were constructed in 1910 after the design of Hazen & Whipple, consulting engineers. They consist of four units of covered filters 65 by 131 feet in plan each. The filter media consists of 3 feet of sand and 10 inches of graded gravel over underdrains of half round 8-inch tile. The specifications call for sand of an effective size of not less than 0.25 mm. nor more than 0.35 mm. and a uniformity coefficient of not more than 3.0. The water is carried over the beds at an average depth of 4 feet. The loss of head varies from a minimum of 0.3 foot to a maximum of 4 feet. The loss of head through the filters is measured by Simplex gages and the rate of filtration is controlled by hand-operated valves.

The filters are operated for 6 and 8 weeks between cleaning the necessity for cleaning being indicated by the loss of head. At times of cleaning

approximately three-fourths of an inch of the top layer is removed by ejector and washed in a sand-washing machine located over the center of the bed. Clean sand is placed on the filters once a year, the amount of sand having been removed amounting to 10 or 12 inches. After cleaning the first filtrate is wasted for about three-fourths of an hour.

From the filters the water flows through a clear water basin immediately adjacent to the most easterly of the filters and whose dimensions are 95 by 131 feet in plan by 10 feet deep and whose capacity is approximately 900,000 gallons. Analyses of the raw and filtered water are made at monthly intervals by the Lederle laboratories of New York city.

Peekskill creek at the point of intake has a watershed of approximately 47 square miles and an average flow of 40,000,000 gallons daily. There are several ponds on the watershed which act as natural storages but over which the village has no regulation. A large storage resevoir with a capacity of 450,000,000 gallons, known as the Wickopee reservoir, was constructed in 1914 near the headwaters of the creek. This reservoir is owned and controlled by the municipality and can be drawn upon to maintain the flow of the stream.

The watershed is of irregular topography, partly wooded and partly devoted to agriculture. The total population may be estimated at 2,000 or 42 per square mile. This population is scattered over the area in isolated farm houses or in small hamlets, no villages or other appreciable centers of population existing thereon. In 1908 a severe outbreak of typhoid fever in Peekskill, which had been investigated by this Department, was attributed to an infection of the then unfiltered supply by a labor camp located on the watershed at the time of the construction of the Catskill aqueduct of the city of New York. Subsequent to this outbreak steps were taken to prevent a recurrence of such an outbreak by the installation of a filter plant. The watershed is also protected by rules and regulations enacted by this Department August 19, 1897. For the enforcement of these rules the village employs an inspector who visits various portions of the watershed every day during the year either by motorcycle, on foot or by driving.

Subsequent to the time of the inspection samples of both raw and treated water were collected by Dr. E. DeM. Lyon, health officer, and the results of the analyses of these samples together with others made in the past by the Division of Laboratories and Research will be found in the appended table.

The results of these analyses show a raw water with high color and slight turbidity. The figures for hardness are moderate and somewhat variable. The total bacterial counts in the two samples of raw water are high and the presence of organisms of the B. coli type in inoculations as small as 1/10 c.c. indicate active contamination of animal or human origin. The analyses of the filtered water indicate that the purification process brings about a removal of turbidity and a marked reduction of color. The total numbers of bacteria in the filtered water are usually moderate or low and only occasionally are organisms of the B. coli type present and then in large inoculations. In view of the above facts, it may be concluded that the public water supply of the village of Peekskill is of a reasonably satisfactory quality, due to the purification brought about by the filtration plant. There seems to be therefore no necessity at this time of making any recommendation other than that the village authorities continue to maintain careful oversight of the sanitary conditions upon the watershed and to continue efficient operation of the purification plant.

In conclusion, I would recommend that copies of this report be sent to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 20, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fisby; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Peekskill	Westchester	Tap, filtered water	1/17/12	15	Cl.			77		56	.024	.058	Tr.	0.20	2.60	2.75	31.2	30.0	30	+	—	—
Peekskill	Westchester	Tap, filtered water	2/20/12	5	Cl.			75		60	.016	.058	Tr.	0.36	2.61	2.50	39.0	37.0	30	—	—	—
Peekskill	Westchester	Tap, filtered water	3/26/12	25	Cl.			69		48	.004	.064	Tr.	0.20	1.10	2.25	49.1	22.0	30	+	—	—
Peekskill	Westchester	Tap, filtered water	4/30/12	25	Cl.			52		36	.004	.076	Tr.	0.14	3.30	1.75	35.1	28.0	30	—	—	—
Peekskill	Westchester	Tap, filtered water	8/27/12	10	Cl.			100		80	.004	.040	.001	0.10	2.40	2.12	55.7	53.0	400	—	—	—
Peekskill	Westchester	Tap, filtered water	10/15/12	10	Cl.			99		82	.020	.058	.001	0.06	2.30	2.75	48.6	44.0	25	—	—	—
Peekskill	Westchester	Tap, filtered water	12/17/12	25	Cl.			77		45	.032	.090	Tr.	0.20	5.00	2.75	37.7	26.0	20	—	—	—
Peekskill	Westchester	Tap, filtered water	1/22/13	20	Cl.			36			.034	.074	Tr.	0.16	3.10	2.25	32.5	22.0	10	+	—	—
Peekskill	Westchester	Tap, filtered water	2/25/13	15	Cl.			63			.010	.032	Tr.	0.24	2.20	2.50	33.8	27.0	10	—	—	—
Peekskill	Westchester	Tap, filtered water	4/ 8/13	15	Cl.			59			.028	.132	Tr.	0.10	2.70	1.75	28.6	22.0	5	—	—	—
Peekskill	Westchester	Tap, filtered water	5/20/13	18	Cl.			60			.014	.054	.001	0.10	2.40	1.75	45.7	34.0	50	—	—	—
Peekskill	Westchester	Tap, filtered water	7/ 2/13	2	Tr.			93			.004	.046	.001	0.20	1.30	2.75	54.3	57.0	.....	—	—	—
Peekskill	Westchester	Tap, filtered water	3/16/14	12	Tr.			60		45	.012	.076	.001	0.20	3.80	2.25	42.9	28.0	55	—	—	—
Peekskill	Westchester	Raw water	6/ 1/17	45	2	0	0				.042	.126	Tr.	0.10	6.40	2.50	32.5	31.0	.....	—	—	—
Peekskill	Westchester	Filtered water	6/ 1/17	25	Tr.	0	2 v.				.010	.052	Tr.	0.16	4.80	2.50	36.4	32.0	.....	—	—	—
Peekskill	Westchester	Raw water	7/12/17	35	2	2 e.	3 e.				.010	.186	.005	0.01	4.40	2.75	44.3	41.0	600	3+0—	3+0—	3+0—
Peekskill	Westchester	Filtered water	7/12/17	15	Tr.	0	1 v.				.004	.056	0	0.16	1.70	2.75	51.4	45.0	35	0+3—	0+3—	0+3—

PETERSBURG

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the public water supply of the village of Petersburg, Rensselaer county. An investigation of this supply was made on April 12, 1917, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. S. P. Hull, health officer of the town of Petersburg, and Mr. A. S. Babcock and Mr. Welch, commissioners of the Petersburg water district.

Petersburg is an unincorporated village in the town of Petersburg in the east central part of Rensselaer county. It is about 18 miles east of Troy and is on the Little Hoosick river and the Rutland railroad. The population at the time of the inspection was estimated at about 250. There are no public sewers in the village, cesspools and privies being used for the disposal of excretal wastes.

The water supply is under the control of the Petersburg water district, and the waterworks were designed by Mr. Earl Percy, civil engineer of Hoosick Falls, and were constructed by contract under the direction of Mr. Percy in 1909. The water supply is obtained from Fly creek and at times from a small tributary thereto, the intakes being about half a mile northwest of the village. An auxiliary supply is obtained from a dug well on the westerly bank of the Little Hoosick river in the northwestern part of the village. The water from the brooks flows by gravity to the village, while the water from the dug well is pumped at a nearby pumping station directly into the mains of the village. About 150 of the population, which corresponds to 60 per cent of the total population of the village, are served by this water supply, and the average daily consumption was estimated to be about 15,000 gallons. There are about 1½ miles of water mains from 4 to 6 inches in diameter. Some 30 of the 50 houses of the village are served by this supply, and none of these services are metered. The average pressure in the village is about 100 pounds per square inch. Water hydrants are placed in the various parts of the village for fire protection, but the village has as yet no fire apparatus or fire hose to use in case of fire.

A dam having a concrete core wall has been constructed across Fly creek to form an open reservoir. From this reservoir the water flows directly to the village. A short distance below this reservoir an intake has been provided which receives water from the small or southerly branch of the creek. When water from this branch is used the main pipe leading to the reservoir has to be closed on account of the lower level of the reservoir intake. No storage is provided on the small branch and water from this source passes directly into the village mains.

The reservoir on the main branch is about 150 by 200 feet in plan, has an average depth of 6 feet and a capacity of approximately 1,300,000 gallons, which is equivalent to about three months' supply. The dam is constructed upon sand and gravel and considerable water leaks underneath the dam.

The well is located in sand and gravel about 12 feet from Little Hoosick river. The well was said to be about 4½ feet square and about 9 feet deep, and covered with timber under about 2 feet of earth. The sides of the well are protected by timber. Due to the character of the soil and to the nearness of the well to the river considerable river water undoubtedly finds its way into the well when in use.

The pumping station is of timber and is about 8 by 16 feet in plan. The pumping apparatus consists of a 6 horse power Novo gasoline engine and a Deane single-action triplex plunger 4 by 4 inch pump. The intake pipe and pumping plant were dismantled at the time of the inspection.

The watershed of Fly creek above the reservoir is about .13 of a square mile, is quite hilly and receives pollution from pasture land only. The southerly tributary has a watershed of about .07 of a square mile and a population of about 8. Part of this watershed is fairly level and considerable

pollution may find its way from the pasture land and from a barn and barnyard through which a branch of the stream passes. The well is located in the lower southwest part of the village and undoubtedly the ground water tributary to it receives some pollution from the various houses and privies located on the land above the well. The Little Hoosick river above the well has a watershed of about 35 square miles, upon which the population is distributed in isolated farm houses and in small hamlets. The pollution received by the stream is consequently largely indirect, although sufficient to render it unsafe for domestic purposes without purification. Whether this river water would receive sufficient purification passing through the ground should it be drawn into the wells at times of heavy draft, is impossible to state with the present available data. There are about 5 houses, having a population of about 25 within 500 feet of the well and 12 houses having a population of about 50 within 1,000 feet of the well.

At the time of the inspection samples of the village water at the various sources were collected and the results of the analyses of these will be found in the appended table. The results of the analyses of the sample collected from a tap in the village show a water clear, free from color and quite soft. The figures for nitrogen in its various forms are comparatively low and the figure for chlorine is slightly above normal for this section of the country, due probably to contamination of animal origin. In the case of the samples collected from both the tap in the village and from the main brook the bacterial counts are moderate for a surface supply and no organisms of the B. coli group were found in the samples inoculated. The sample from the southerly branch, however, has a very high count of bacteria and organisms of the B. coli type were found in two of the 10 c.c. inoculations tested, showing considerable pollution apparently received from the barnyard and from the road alongside which the brook passes for a considerable distance. The sample from the well near the river was taken from a private supply, and due to the small amount of water used it was undoubtedly upland water rather than river water. The results of the analyses of this sample show a moderate count of bacteria and no organisms of the B. coli type in the inoculation tested.

As a result of this investigation and of the analyses the following conclusions may be drawn:

1. That Fly creek, the regular source from which the public water supply of Petersburg is derived, is reasonably satisfactory from a sanitary standpoint, although open at times to a small amount of contamination from pasture land.
2. That the southerly branch of Fly creek is unsatisfactory on account of the opportunities for pollution from a barnyard and from road drainage.
3. That the auxiliary well supply is rather unsatisfactorily located in the lower part of the village, although without a more extended series of analyses, it is impossible to state definitely the effect nearby sources of pollution may have upon its sanitary quality. From the inspection, however, it would appear that this well, under heavy draft, would receive unfiltered water from the river without adequate purification.

In view of the above conclusions I would make the following recommendations:

1. That no cattle be permitted to pasture within 50 feet of the reservoir on Fly creek.
2. That the south branch of Fly creek be abandoned as a source of water supply unless suitable and adequate methods be provided for its purification.
3. That on account of the rather unsatisfactory location of the auxiliary well in the lower part of the village near several sources of possible pollution and also on account of the close proximity of the river, that this well be abandoned, and in case additional water is required it should

be obtained from a new source free from pollution or from a well or wells at least 50 feet from the river and remote from other potential sources of pollution.

I would finally recommend that copies of this report be transmitted to the commissioners of the Petersburg waterworks district, to the health officer of the town of Petersburg and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 19, 1917

REPORT OF WATER ANALYSES FOR PETERSBURG

Source	Tap in village	Northerly branch, Fly Creek	Southerly branch, Fly Creek	Well near river
Collected on	4/12/17	4/12/17	4/12/17	4/12/17
Color	Cl.	.....	.....	.....
Odor, hot	1 v.	.....	.....	.....
Odor, cold	1 v.	.....	.....	.....
Turbidity	Tr.	.....	.....	.....
Solids, total	.....	.....	.....	.....
Loss on ignition	.....	.....	.....	.....
Mineral residue	.....	.....	.....	.....
Ammonia, free	.006	.....	.....	.....
Ammonia, albuminoid	.028	.....	.....	.....
Nitrites	.001	.....	.....	.....
Nitrates	Tr.	.....	.....	.....
Oxygen consumed	1.5	.....	.....	.....
Chlorine	1.5	.....	.....	.....
Hardness, total	20.8	.....	.....	.....
Alkalinity	9.0	.....	.....	.....
Bacteria per c.c.	70	25	375	40
B. coli type, 10 c.c.	0+3—	0+3—	2+1—	0+3—
B. coli type, 1 c.c.	0+3—	0+3—	0+3—	0+3—
B. coli type, 1/10 c.c.	0+3—	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

PLEASANTVILLE

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Pleasantville, made by Mr. C. M. Baker, assistant engineer, on January 19, 1917.

Pleasantville is an incorporated village with 2,464 inhabitants, located in Westchester county, on the Harlem division of the N. Y. C. & H. R. R., about 26 miles north of New York city. No sewerage system is provided in the village, the houses being served by privies, cesspools, etc.

The water supply system was first installed in 1901 or 1902, the water being secured from an impounding reservoir on a small brook about 1 mile southeast of the village. From this reservoir the water flowed by gravity to a pumping station which pumped the supply through pressure filters into the distribution system. The watershed is protected by rules and regulations enacted by this Department in 1902. Due to the difficulty and expense of maintaining proper sanitary conditions on this watershed and purifying the supply, also to the fact that part of the watershed had been taken over by the city of New York in connection with the development of its water supply, a new supply has been developed from a well located near the old reservoir, although the old supply is still connected with the system so that it can be used in case of necessity.

The water supply is owned by the municipality and the present system was first put into operation July 15, 1916. From the well the water is conducted by a siphon to suction wells located near the pumping station, from which the water is pumped directly into the distribution system, the excess over consumption going to a concrete storage reservoir located on a nearby hill. The distribution system consists of about 8 miles of mains ranging from 4 to 16 inches in diameter except for a few lines of 2-inch pipe, supplying 2 or 3 houses. There are in all 576 services, only 4 or 5 of which are metered. The water pressure ranges from 50 to 125 pounds per square inch, it being necessary in some parts of the village to regulate the pressure by pressure-reducing valves.

The pumping station is located about 1 mile east of the railroad station and is equipped with one 50 horse power motor, direct connected to a Rumsey pump having a capacity of 312 gallons per minute, also a 30 horse power motor, direct connected to a Gould triplex pump having a capacity of 300 gallons per minute. The reservoir is constructed of concrete and is uncovered, but is protected by woven wire fence constructed around it, 3 feet from the edge of the reservoir. The capacity of the reservoir is about one-half million gallons. The suction wells, 2 in number, are located just above the pumping station. The upper one is 21 by 90 feet in plan by 7 feet and has a capacity of 99,000 gallons. The lower one is 30 feet in diameter by 11 feet deep, having a capacity of 58,000 gallons, thus providing for a total storage of 157,000 gallons. With the yield from the well, which is estimated at a maximum of about 288,000 gallons per day, this storage will supply the pumps for about 9 hours during which time approximately 300,000 gallons or three times the normal daily consumption may be pumped. The storage reservoir consists of only one compartment so that in case of cleaning it would be necessary to cut the whole reservoir out of service. While the yield from the well together with the water stored in the suction wells would furnish sufficient water for the normal consumption while cleaning the reservoir, it is possible that in case of a large fire the storage would be inadequate, thus making it necessary to draw upon the auxiliary supply. Furthermore the present pumping equipment can deliver only 612 gallons per minute, which would be inadequate for a large fire.

The well from which the supply is derived is located about 100 feet from the stream on a low area just southeast of the impounding reservoir used in connection with the old supply. The well is 9 feet in diameter by 24 feet deep. It is curbed with a concrete wall and covered, the curb extending about 2 feet above the surface of the ground. The strata through which the well passes consist of sand and clay. It is said that there is no danger of flooding the area about the well at time of high water. The engineer in charge of the pumping station stated that the yield of the well had been estimated at 337,000 gallons per day, although the siphon leading from it to the suction wells will deliver only about 288,000 gallons daily. There are no houses in the vicinity of the well and no insanitary conditions were observed at the time of the inspection. It seems therefore that this well should furnish a satisfactory supply of water provided it is at all times properly protected from pollution. The yield of the well at present appears to be sufficient for the needs of the village and should additional water be required it could doubtless be provided by the construction of additional wells.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of the analyses show a water satisfactory in physical qualities with respect to color and turbidity and a water that is very hard. The figures for nitrogen as free and albuminoid ammonia appear to be somewhat high as are also those for nitrates and chlorine, thus indicating that pollution finds its way into the ground water tributary to the supply. The low bacterial count and absence of colon bacilli, however, indicate that this pollution has been rendered inactive by the natural processes of purification and that the supply was in a satisfactory condition at the time of the inspection.

As a result of this investigation it may be concluded:

1. That the regular water supply of Pleasantville is derived from a source which should furnish satisfactory water provided adequate precautions are at all times taken to protect the well from pollution.
2. That, however, the old reservoir is still retained as an auxiliary supply and should therefore be maintained in a proper sanitary condition.
3. That inadequate storage is provided at times when it is necessary to clean the storage reservoir.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That care be taken to at all times maintain adequate sanitary conditions in the vicinity of the well to prevent any possibility of pollution.
2. That if the old system is to be retained as an auxiliary supply, the watershed should be maintained in a sanitary condition by the enforcement of the rules and regulations protecting it and furthermore the filters should be ready for service at any time. If the old system is not to be retained the connection between it and the present system should be removed.
3. That consideration be given either to dividing the storage reservoir into two parts or providing additional storage in order to provide adequate fire protection at times of cleaning the reservoir.

In conclusion, I would recommend that copies of this report be sent to the village officials and the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 6, 1917

REPORT OF WATER ANALYSIS FOR PLEASANTVILLE

Source		Tap in village
Collected on		1/18/17
Color		Tr.
Odor, hot		1 v.
Odor, cold		1 v.
Turbidity		Cl.
Solids, total		.....
Loss on ignition		.....
Mineral residue		.....
Ammonia, free		.016
Ammonia, albuminoid		.050
Nitrites		.002
Nitrates		0.24
Oxygen consumed		1.00
Chlorine		3.75
Hardness, total		174.2
Alkalinity		103.0
Bacteria per c.c.		20
B. coli type	10 c.c.	0+3—
	1 c.c.	0+3—
	1/10 c.c.	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

PORT LEYDEN

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Port Leyden, made by Mr. C. M. Baker, assistant engineer, on October 25, 1916.

Port Leyden is an incorporated village of 753 inhabitants, located in Lewis county, on the Utica and Ogdensburg branch of the N. Y. C. railroad, 42 miles north of Utica. The village is located on the Black river. Private sewer systems, which discharge without treatment into the Black river, serve a part of the village, the rest of the houses being served by privies, cesspools, etc.

The water supply is owned by the municipality and is derived from the south and middle forks of Cold brook, a tributary to the Black river. Dams are constructed on each fork forming small impounding reservoirs, at practically the same elevation, from which the water flows by gravity to the village. Originally the water supply was derived from the south fork only. This supply was put into operation in 1897. In 1893, however, an additional supply was developed from the middle fork. About 90 per cent of the population is served with water, there being in all about 200 service taps, none of which are metered. There are some four miles of water mains, ranging in size from 4 to 10 inches in diameter. The pressure in the village averages about 85 pounds per square inch. Since there are no meters nor other method of measuring the water used, no definite information could be obtained regarding the consumption, but based upon a per capita rate of 100 gallons per day the daily consumption would be approximately 70,000 gallons.

The sources of the streams tributary to the supply are springs, which issue from the foot of steep banks of ravines. The dams forming the impounding reservoirs mentioned above are located near the sources of the streams and are constructed of earth with concrete core walls. The capacity of each of the reservoirs is about 400,000 gallons. The tributary watershed to each supply is 14 or 15 acres in area. Two and one-half acres in the vicinity of the old reservoir are owned by the village, the greater part of the remaining watershed being uninhabited wooded land, although a small portion is used for pasture land. All the watershed, 13.6 acres, tributary to the new supply, is owned by the village, and although not enclosed by a fence at the time of the inspection, the engineer was informed that a fence is to be constructed. Consideration is also being given by the village authorities to the purchase of the remainder of the watershed tributary to the old supply. No insanitary conditions were observed on either of the watersheds at the time of the inspection, although as mentioned above, it is possible that pollution of animal origin at times finds its way into the old reservoir from the pasture land on the watershed.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which, together with those of previous analyses, are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity and also a water that is low in hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low, but those for nitrates and chlorine appear to be somewhat above normal. The bacterial counts are low except in a few cases, but colon bacilli are frequently present in 10 c.c. inoculations and occasionally in 1 c.c. inoculations, thus indicating the presence of active and potentially dangerous contamination. It is probable, however, that this pollution is of animal rather than human origin, and is probably caused by surface wash from pasture land finding its way into the old reservoir. The results of the analyses of samples collected at the time of the inspection

show the presence of colon bacilli in the water collected from the old reservoir. Colon bacilli were also found present in the water collected from a tap in the village at this time.

As a result of this investigation it may be concluded:

1. That the original water supply of Port Leyden is derived from a source which is subject to a small amount of pollution from pasture land on the watershed tributary to the reservoir.

2. That the new supply is derived from a source which if properly fenced and protected should furnish a satisfactory supply.

In view of the above, I beg to offer the following recommendations, to be acted upon by the village authorities:

1. That steps be taken immediately to purchase the remainder of the watershed tributary to the south fork supply and that this area be enclosed by a substantially constructed fence.

2. That the proposed fence be constructed about the watershed of the new supply as soon as practicable.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 8, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Port Leyden	Lewis	Tap, public supply	11/15/10	5	Cl.	....	....	48	....	32	.004	.020	.003	1.44	0.30	1.00	22.1	19.0	50	—	+	—
Port Leyden	Lewis	Tap, public supply	3/15/11	Tr.	Cl.	....	....	56	....	31	.012	.036	.001	1.40	0.60	1.50	23.4	18.0	95	+	—	—
Port Leyden	Lewis	Tap, public supply	6/ 2/11	5	Tr.	....	....	42	....	21	.018	.034	.009	0.40	1.50	1.00	18.2	15.0	300	+	—	—
Port Leyden	Lewis	Tap, public supply	10/11/11	1	Cl.	....	....	50	....	30	.006	.034	.001	0.80	1.40	1.50	22.1	18.0	90	—	—	—
Port Leyden	Lewis	Tap, public supply	12/28/11	Tr.	Cl.	....	....	46	....	32	.006	.010	.002	0.90	0.60	1.12	22.1	16.0	150	—	—	—
Port Leyden	Lewis	Tap, public supply	3/19/12	Tr.	Cl.	....	....	47	....	29	.008	.018	Tr.	1.08	0.60	0.75	15.6	15.0	110	—	—	—
Port Leyden	Lewis	Tap, public supply	4/23/12	Tr.	Cl.	....	....	54	....	51	.006	.018	.001	0.80	0.60	1.00	20.8	16.0	800	+	—	—
Port Leyden	Lewis	Tap, public supply	9/10/12	Tr.	Cl.	....	....	55	....	39	.004	.006	.001	0.90	0.60	0.75	27.3	15.0	20	+	—	—
Port Leyden	Lewis	Tap, public supply	10/28/12	2	Cl.	....	....	48	....	36	.012	.040	.001	0.86	1.30	0.27	19.5	16.0	750	+	—	—
Port Leyden	Lewis	Tap, public supply	12/ 9/12	Tr.	Cl.	....	....	51	....	39	.010	.046	Tr.	0.88	0.80	0.87	24.7	13.0	240	+	—	—
Port Leyden	Lewis	Tap, public supply	1/16/13	Tr.	Cl.	....	....	31	....	....	.020	.014	.002	0.90	1.00	0.75	15.6	13.0	350	+	—	—
Port Leyden	Lewis	Tap, public supply	2/17/13	5	Cl.	....	....	36	....	....	.010	.040	Tr.	0.90	1.30	1.12	22.1	14.0	70	—	—	—
Port Leyden	Lewis	Tap, public supply	3/31/13	Tr.	Cl.	....	....	30	....	....	.026	.050	Tr.	0.70	0.60	1.25	16.9	12.0	120	—	—	—
Port Leyden	Lewis	Tap, public supply	5/12/13	Tr.	Cl.	....	....	43	....	....	.014	.024	.001	0.80	0.60	1.00	19.5	15.0	240	—	—	—
Port Leyden	Lewis	Tap, public supply	6/23/13	2	Tr.	....	....	52	....	....	.004	.006	.001	0.90	0.30	0.75	19.5	15.0	.....	+	+	—
Port Leyden	Lewis	Tap, public supply	7/29/13	Tr.	Tr.	....	....	48	....	....	.010	.024	Tr.	0.80	0.70	0.75	19.2	18.0	.....	+	—	—
Port Leyden	Lewis	Tap, public supply	5/12/14	Tr.	Cl.	....	....	47	....	35	.004	.016	Tr.	0.60	0.80	0.25	20.8	16.0	3,200	—	—	—
Port Leyden	Lewis	Reservoir, old supply	10/25/16	....	....	....	....	....	....	....	....	....	....	....	....	1.00	.....	.....	700	3+0—	0+3—	0+3—
Port Leyden	Lewis	Reservoir, new supply	10/25/16	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	.....	300	0+3—	0+3—	0+3—
Port Leyden	Lewis	Tap in village	10/25/16	Tr.	Cl.	....	....	....	....	....	.002	.020	.001	0.92	1.40	1.13	41.6	26.0	40	1+2—	1+2—	0+3—

PROSPECT (Chan-Glenn Spring)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply furnished by the Chan-Glenn Spring Company, commonly known as the Hodge & Dodge Supply, to a portion of the village of Prospect. An investigation was made of this supply by Mr. C. M. Baker, assistant engineer, on October 23, 1916.

Prospect is an incorporated village of 339 inhabitants, according to the 1915 census, located in Oneida county on the Utica and Oneida branch of the N. Y. C. & H. R. railroad, about 18 miles north of the city of Utica. It is in a prosperous dairying district. No sewer system is provided in the village, the houses being served by privies, cesspools, etc.

The supply is derived from springs located about half a mile northwest of the village. The water is conducted from the springs into a collecting basin whence it flows by gravity to the consumers. The supply was put into operation about 1883. The owners of the supply are Messrs. Chancey B. Hodge and Glenn P. Dodge. About a third of the population of the village is served with water from this supply, there being in all 24 service taps, none of which are metered. The remainder of the village is served by another supply known as the Prospect Spring Supply. No definite information could be obtained regarding the consumption, but based upon a per capita rate of 100 gallons daily, the total consumption per day would be about 17,000 gallons. The pressure in the village is sufficient only for domestic purposes, no fire protection being provided. There are in all about three-fourths of a mile of mains which consist of 1½ and 2 inch pipe.

The springs are located near the foot of a hill in a low swampy area. They are walled and covered with concrete and appeared to be satisfactorily protected from surface wash. From the springs the water flows by gravity into the collecting basin, which is about 6 feet square by 4 feet deep. This collecting basin is covered.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which, together with those of previous analyses, are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity, although quite high in hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low. Those for nitrates and chlorine, however, appear to be somewhat above normal, thus indicating that pollution has found its way into the ground water tributary to the supply. The bacterial counts are low in all cases and colon bacilli have in no case been found present, thus indicating the absence of active contamination.

As a result of this investigation it may be concluded that the water supply of the Chan-Glenn Spring Company is derived from a source which is well protected from pollution and that the water was of a satisfactory quality at the time of the inspection.

It seems necessary, therefore, to recommend at this time only that the owners of the supply continue their careful supervision in order that no insanitary conditions may exist which will in any way pollute the water.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 8, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Prospect	Oneida	Chan-Glenn spring or Hodge & Dodge supply	2/12/11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	45	−	−	−
Prospect	Oneida	Chan-Glenn spring or Hodge & Dodge supply	10/12/11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	30	−	−	−
Prospect	Oneida	Chan-Glenn spring or Hodge & Dodge supply	3/30/13	Tr.	Cl.	....	....	143	....	124	.022	.024	Tr.	0.90	0.50	1.25	117.2	106.0	10	−	−	−
Prospect	Oneida	Chan-Glenn spring or Hodge & Dodge supply	4/ 3/13	Tr.	Cl.	....	....	140	....	....	.006	.003	Tr.	0.80	0.30	1.25	114.2	107.0	25	−	−	−
Prospect	Oneida	Chan-Glenn spring or Hodge & Dodge supply	5/15/13	Tr.	Cl.	....	....	144	....	....	.010	.010	Tr.	0.66	0.20	1.00	120.0	102.0	25	−	−	−
Prospect	Oneida	Chan-Glenn spring or Hodge & Dodge supply	5/21/14	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	−	−	−
Prospect	Oneida	Chan-Glenn spring or Hodge & Dodge supply	10/23/16	Tr.	Cl.	1 a.	1 a.	156	17	139	.002	.002	Tr.	0.50	0.25	1.25	120.0	112.0	5	0+3−	0+3−	0+3−

PROSPECT (Prospect Spring Co.)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply furnished by the Prospect Spring Company, also known as the Maxfield Supply, to a portion of the village of Prospect. The investigation was made of this supply by Mr. C. M. Baker, assistant engineer, on October 23, 1916.

Prospect is an incorporated village of 339 inhabitants, according to the 1915 census, located in Oneida county, on the Utica and Oneida branch of the N. Y. C. railroad, 18 miles north of Utica. It is in a prosperous dairying district. No sewers are provided in the village, the houses being served by privies, cesspools, etc.

The supply is owned by Mrs. R. B. Maxfield and was first put into operation about 1906. Water is obtained from springs about half a mile northwest of the village, whence it is conducted by gravity to the consumers. Two-thirds of the population of the village are served with this water, there being in all 95 service taps, none of which are metered. The remainder of the village is served by another supply, known as the Chan-Glenn Spring supply. Since there are no meters nor other methods of measuring the water used, no definite information could be obtained regarding the consumption, but based upon a per capita rate of 100 gallons daily the total consumption would be about 33,000 gallons per day. There are about 2 miles of water mains, ranging in size from 1 to 3 inches in diameter. The pressure is only about 28 pounds per square inch, but the supply is used only for domestic purposes, no fire protection being provided.

The springs are located near the foot of a hill and are enclosed by a fence. They are protected by concrete walls and covered so that surface drainage cannot find its way directly into them. Water flows from the springs by gravity to a collecting basin about 10 by 22 feet in plan and 5 feet deep, and having a capacity of a little over 2,000 gallons. From the collecting basin the water flows by gravity to the village. The water is also bottled and sold. No insanitary conditions were observed about the springs.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those previous analyses are recorded in the appended table.

The results of these analyses show a water that is satisfactory in physical qualities with respect to color and turbidity but a water that is quite hard. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low but those for nitrates and chlorine appear to be somewhat above normal, thus indicating that pollution has found its way into the ground water tributary to the supply. The bacterial counts are low in all cases, however, and colon bacilli are in no case present, thus indicating the absence of active contamination at the time the samples were collected, and that the pollution mentioned above had been rendered inactive by the natural processes of purification.

As a result of this investigation it may be concluded that the water supply of the Prospect Spring Company is derived from a source which is well protected from pollution and that the springs if properly maintained at all times should furnish water of a satisfactory quality.

It therefore seems advisable to recommend at this time only that the water company continue their careful supervision of the supply in order that no insanitary conditions may at any time exist which will in any way pollute the water.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 8, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT —=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Prospect	Oneida	Tap, Prospect spring or Maxfield supply	2/16/11	1	Cl.	....	....	151	....	131	.014	.020	.003	0.60	0.40	0.75	128.6	128.0	30	—	—	—
Prospect	Oneida	Tap, Prospect spring or Maxfield supply	10/12/11	Tr.	Cl.	....	....	172	....	152	.024	.030	.001	0.60	0.20	1.00	148.6	130.0	10	—	—	—
Prospect	Oneida	Tap, Prospect spring or Maxfield supply	1/15/13	Tr.	Cl.	....	....	167	....	....	.008	.034	Tr.	1.50	0.40	1.50	137.2	118.0	40	—	—	—
Prospect	Oneida	Tap, Prospect spring or Maxfield supply	2/20/13	Tr.	Tr.	....	....	160	....	143	.026	.044	Tr.	2.40	0.40	1.00	131.4	120.0	10	—	—	—
Prospect	Oneida	Tap, Prospect spring or Maxfield supply	4/ 3/13	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	—	—	—
Prospect	Oneida	Tap, Prospect spring or Maxfield supply	5/15/13	Tr.	Cl.	....	....	163	....	....	.016	.010	.001	1.50	0.30	2.50	117.2	113.0	150	—	—	—
Prospect	Oneida	Tap, Prospect spring or Maxfield supply	5/21/14	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	—	—	—
Prospect	Oneida	Tap, Prospect spring or Maxfield supply	10/23/16	Tr.	Tr.	1 v.	1 v.	147	13	134	Tr.	Tr.	Tr.	0.34	0.60	1.00	131.4	127.0	10	0+3—	0+3—	0+3—

QUEENS COUNTY WATER CO.

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply furnished by the Queens County Water Company to the incorporated villages of Lawrence, Cedarhurst, Lynbrook, East Rockaway and Woodsburgh; also to the unincorporated villages of Inwood, Valley Stream and Oceanside, in Nassau county, in addition to the Far Rockaway peninsula in Queens county. An investigation of this supply was made by Mr. C. M. Baker, assistant engineer, on September 27, 1916.

The territory in Nassau county supplied by this company is located in the southwestern corner of the town of Hempstead and includes a total population of about 17,500 persons. The population of the incorporated villages are as follows: Lawrence, 1,870; Cedarhurst, 2,657; Lynbrook, 3,055; East Rockaway, 1,607, and Woodburgh, 168, thus leaving a total population of 8,143 in the unincorporated territory. In the Queens county territory the population is about 12,500, thus making a total population tributary to the supply of about 30,000 persons. The population in these places is considerably increased during the summer by the influx of the summer residents. This is particularly true in the Queens county district, there being considerably less variation in the population in Nassau county. Practically none of the territory in Nassau county is provided with sewers, the houses being served with privies, cesspools, etc. The territory tributary to the supply is reached via the Far Rockaway branch of the Long Island Railroad and is 18 to 25 miles from New York city.

The main offices of the company are at Far Rockaway. Mr. Henry DeForest Baldwin, 49 Wall street, New York city, is president of the company. The supply was first put into operation in 1885 or 1886. Since the original installation extensions have been made to the distribution system and an auxiliary plant consisting of wells, pumping equipment and standpipe, has been constructed at Rockaway Beach. The main pumping plant, which is a part of the original installation, is located about 1 mile southwest of Valley Stream. From the wells located at this place water is pumped into the distribution system after being aerated and passed through slow sand filters for the purpose of removing iron that is in the water. The supply is equalized by standpipes at Far Rockaway and Rockaway Beach. Water is pumped from the Rockaway Beach plant during the summer only, since, due to the heavy consumption and limited capacity of the trunk main, the supply at times is somewhat inadequate in this section.

Practically all of the population tributary to the supply in Queens county are supplied with the water, there being in all about 6,000 service taps in this section. In Nassau county, however, only a portion of the people are supplied, there being only 4,000 service taps. All services are metered. The consumption averages about 2,000,000 gallons daily in the winter and about 4,000,000 gallons with a possible maximum of 5,000,000 gallons during the summer. Only about ¼ of the water pumped during the summer months is used by the Nassau county consumers, the remainder being used in Queens county. This is due in part to the greater number of service taps in Queens county and also probably to some extent to the class of people tributary to the supply, it being apparent that the majority of people in Queens county are more extravagant users. At the time of the inspection about 3,000,000 gallons of water per day were being used by the people directly tributary to the supply. In addition to this, however, the company was supplying about 5,000,000 gallons daily to New York city, making a total yield of 8,000,000 gallons. There are in all about 190 miles of water mains, 100 of which are in Nassau county. The size of the mains ranges from 1¼ inches to 24 inches in diameter. The pressure averages about 60 pounds per square inch.

The pumping equipment at the main plant consists of three 190-horsepower steam boilers, 3 Tod pumps with capacities of 6,000,000, 7,500,000 and 8,000,000 gallons per day respectively; also 5 Worthington pumps with capacities ranging from 1,700,000 gallons to 5,000,000 gallons per day and one

Davidson pump with a capacity of 6,000,000 gallons daily. Because of filtration it is necessary to pump the water twice. The pumps are housed in a brick building. At the Far Rockaway Park plant there are 3 Worthington pumps with a total capacity of 3,500,000 gallons daily. The actual pumpage at this plant averages about 150,000 or 200,000 gallons daily during the summer only. The Far Rockaway standpipe is 20 feet in diameter, 140 feet high and has a capacity of 329,000 gallons. The standpipe at Rockaway Park is 18 feet in diameter, 180 feet deep, its capacity being 247,000 gallons, thus making a total storage of 576,000 gallons.

At the main plant located near Valley Stream there are 75 shallow wells ranging in depth from 22 to 32 feet, also 53 deep wells ranging in depth from 143 to 204 feet. The shallow wells are 5 inches in diameter except one which is 10 inches, while the deep wells are all 6 inches in diameter. The strata through which the shallow wells pass consist of sand only while the deep wells are driven through 32 feet of sand, 7 feet of clay and 40 feet of blue clay into a stratum of sand and coarse gravel. The wells are direct connected with the suction lines. About this plant the company owns about 250 acres of land. There are no houses in the vicinity and no insanitary conditions were observed.

At the Rockaway Park plant there are three deep wells. It is probable that water from this plant never leaves the Nassau county district, being all consumed on the Rockaway peninsula.

Due to the large amount of iron in the water it is unsatisfactory for domestic purposes in its raw state. For the purpose of removing the iron therefore the water is first aerated, then passed through slow sand filters. The plant at the main pumping station consists of 3 filters, each 100 by 200 feet in plan, and 2 fountain aerators. The area of each of the filters is thus nearly ½ acre and since two are operated continuously — one usually being out of service for the purpose of cleaning — the area in service is usually about 1 acre. The rate of filtration therefore ranges from 2,000,000 gallons per acre per day in the winter to 4,000,000 in the summer and was about 8,000,000 gallons per acre per day at the time of the inspection. Each filter is cleaned after 30,000,000 or 40,000,000 gallons of water pass through it.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of these analyses show that both the raw and filtered waters were satisfactory with respect to color and turbidity and that the water is low in hardness. The figures for nitrogen in its various forms are low and the figures for chlorine appear to be practically normal. The raw water contained 1 part per million of iron while the filtered contained only 1/10 part, thus indicating a substantial removal of the iron from the water in the process of purification. The samples were delayed in transit, two days elapsing from the time they were collected until received at the laboratory. The high bacterial counts in the filtered water are therefore apparently due in part at least to this delay. Colon bacilli were not found present in either the raw or filtered water.

As a result of this investigation it may be concluded that the water supply of the Queens County Water Company is derived from a source which should furnish water of a satisfactory sanitary quality, it being necessary, however, to treat the water for the removal of iron. Some complaints have been made on the Rockaway peninsula regarding the taste of iron in the water when raw water was being pumped from the Rockaway Park plant, although apparently no complaints have been made in this respect by the Nassau county consumers.

In view of the above it seems advisable to recommend at this time only that the company continue their careful supervision of the supply in order that the water may continue to be of a satisfactory quality.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 6, 1917

REPORT OF WATER ANALYSES FOR QUEENS COUNTY WATER CO.

Source		Raw water	Treated water
Collected on		9/27/16	9/27/16
Color		tr.	tr.
Odor, hot		1 v.	1 v.
Odor, cold		1 v.	1 v.
Turbidity		2	cl.
Solids, total		46	45
Loss on ignition		26	13
Mineral residue		20	32
Iron		1.0	0.10
Ammonia, free		.032	.002
Ammonia, albuminoid		.018	.012
Nitrites		.003	.002
Nitrates		0.10	0.02
Oxygen consumed		0.60	0.70
Chlorine		7.00	7.25
Hardness, total		15.60	15.60
Alkalinity		12.00	12.00
Bacteria per c.c.		.....	*1,000
B. coli type	10 c.c.	0+3—	0+3—
	1 c.c.	0+3—	0+3—
	1/10 c.c.	0+3—	0+3—

* Two days in transit.
Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

RAYBROOK (State Hospital for Incipient Pulmonary tuberculosis)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the sanitary condition of the water supply of the State Hospital for Incipient Pulmonary Tuberculosis at Ray Brook made by Mr. C. M. Baker, assistant engineer, on November 1, 2 and 3, 1917.

This investigation was taken up subsequent to the occurrence of several cases of typhoid fever at the institution and following the receipt of information to the effect that a lumbermen's camp had been established upon the watershed from which the supply is obtained.

General information

Location.— Ray Brook, Essex county.

Population.— October 1, 1917, patients, 299; employees, 110; total, 409.

Source of supply.— Small mountain brook which is tributary to Ray Brook, the intake being about 2¼ miles northeast of the institution.

Consumption.— Roughly estimated at from 50,000 to 135,000 gallons per day.

Distribution system.—A 4-inch cast-iron pipe conducts the water by gravity from the intake to a 1,000,000-gallon and a 25,000-gallon storage reservoir on a hill back of the institution, from which the water flows by gravity through the distribution system. These reservoirs are side by side and are supplied by a Y branch inlet.

Pressure.— The top of the storage reservoir is about 85 feet higher in elevation than the main buildings of the institution, thus giving a pressure of about 35 pounds per square inch.

Storage.— Two reservoirs, one with an estimated capacity of 1,000,000 gallons and the other 25,000 gallons.

Purification.— None.

Reference to previous investigations.—1915, 36th Annual Report and report under date of June 21, 1917.

The watershed from which the supply is obtained lies on the side of a mountain about 3 miles northeast of the institution and is about 1 square mile in area. At the time of the previous investigations there were no inhabitants on this watershed nor were there any roads or prominent trails across it. It was therefore apparent that the supply was subject to only accidental, incidental or wilful pollution from chance hunters or trespassers upon the watershed or from wild animals in the vicinity. About the middle of June, 1917, however, a lumber camp was established on the watershed by the Champlain Paper Company, a subsidiary company of the International Paper Company. Furthermore, a road has been constructed across the watershed over which the logs being cut will be hauled to the Ray Brook station during the winter.

This camp is located on a stream tributary to the supply at a point about 1½ miles above the intake. At the time of an inspection of the camp by an official of the institution, about October 10, 1917, two insanitary privies were found to be located close to the stream. On October 18 and 26 inspections of the camp were made by Dr. Ball, sanitary supervisor. At the time of Dr. Ball's first inspection one privy provided with a wooden box vault was found to be located about 25 feet from the stream and another provided with no vault was about 150 feet distant. Later at Dr. Ball's suggestion these privies were moved to a greater distance from the stream.

An inspection was made of the camp by the Assistant Engineer on November 1, 1917. At this time one privy provided with a wooden box vault was located about 60 feet from the stream while the other was about 300 feet distant and was provided with an earth vault about 4 feet deep. Trenches were being dug well back from the stream in which to dispose of the contents of the box vault. The building which contains the kitchen and living quarters of the camp is located about 50 feet from the stream and the barn is about 150 feet distant. Slops and wash water are thrown on the ground near the kitchen. At the time of this inspection there were some 25 people present at the camp. The road mentioned above traverses practically the full length of the watershed crossing streams tributary to the supply in a number of places.

Six cases of typhoid fever have occurred at the institution, one case occurring on each of the following dates: September 24, 25, 28 and October 1 and two occurring later, on October 17, 1917. Three of the cases were patients at the institution and two were employees while the sixth was a storekeeper located about ¼ of a mile from the institution. All of these people except the storekeeper used the water from the institution supply. Although full information could not be obtained, it was alleged that none of those at the camp had had any sickness. Accurate information of this character, however, is of course always difficult to obtain. Several employees had already left the camp. Although many of the present employees had been tested for Widal reaction, not all had been, nor had other tests been made to fully determine and exclude entirely the presence of any carriers among the employees or visitors to the camp.

Samples of the water were collected by Dr. Ball, sanitary supervisor, also by the authorities of the institution, and sent to the Division of Laboratories and Research for analyses prior to the time of this investigation. These analyses have not been completed as yet, but judging from the preliminary results there is little doubt that the final results will show active contamination from the sources found to exist on the watershed.

As a result of this investigation it is evident that the stream from which the water supply of the hospital is obtained is subject to contamination and that there is potential danger of an infection of the supply, not only from the privies located near the stream but also from the workmen who traverse the watershed and are at times working some distance from the camp and who doubtless do not at all times under these conditions observe proper sanitary precautions. The ways in which contamination may find its way into the stream from the various sources are too numerous and obvious to warrant detailed discussion here.

As a result of this investigation it may be concluded:

1. That the following conditions on the watershed from which the hospital supply is obtained constitute a serious menace to the sanitary quality of the supply:

(a) The maintenance of a permanent camp and privies in connection therewith in close proximity to the stream from which the supply is obtained.

(b) The presence of some 20 or 30 persons on the watershed, who traverse it to a considerable extent and who work in different parts of the watershed some distance from the permanent camp during the day.

(c) The maintenance of a road across the watershed which crosses the stream in several places and along which there will be considerable travel.

2. That although these cases of typhoid might be attributable to other causes than the water supply, such as milk, contact or typhoid carriers, the contamination of the water referred to above might readily account for the cases that have occurred..

3. That irrespective of the part which the water supply has actually played in the causation of the cases of typhoid that have occurred there is absolutely no doubt as to the potential danger of the present supply under the conditions found to exist on the watershed nor as to the impracticability of adequately protecting the supply by applying preventive measures of protection only under the existing conditions. It follows therefore that adequate protection from this potential or actual menace can be secured only by proper treatment of the water supply.

In view of the above, I beg to offer the following recommendations:

1. That apparatus be provided by the institution at once and that the water supply be sterilized with liquid chlorine.

2. That the Champlain Realty Company maintain in a proper sanitary condition the privies and labor camp located on the watershed and that the use of the privies at all times by the workmen be enforced in order to minimize the pollution of the stream and vicinity as far as possible.

3. That inspections be frequently made of the camp by the institutional authorities and that every effort be made to have proper sanitary conditions maintained at the camp.

The apparatus for sterilizing the water can be conveniently installed just below the storage reservoir so as to apply the chemical into the main from the intake before the water reaches the Y branch leading to the separate reservoirs. It would be necessary to provide a small structure to shelter the apparatus, also to provide some method of heating it, since, if the temperature of the apparatus drops below 40 degrees F., trouble is apt to be experienced in its operation. It is probable that, if the building is tightly constructed, an oil heater would furnish sufficient heat. The advantages of applying the chlorine at the place indicated are: First, all of the water could be treated at this place; second, the flow of water through this main is practically constant, the excess over consumption being allowed to discharge through an overflow from the reservoir; and, third, the plant would be located near the institution so that it could be easily looked after by a regular employee.

Finally, I would recommend that copies of this report be sent to the Fiscal Supervisor of State Charities, to the board of trustees and superintendent of the institution, to the sanitary supervisor of the district and to the Champlain Realty Company.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *November* 7, 1917

RENSSELAER (Municipal Supply)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Rensselaer, made by Mr. C. M. Baker, assistant engineer, on March 23, 1917.

Rensselaer is a city of 11,210 inhabitants, located on the east bank of the Hudson river, directly across from Albany. Municipal and private sewers are provided which discharge without purification into the Hudson river.

The water system is owned and operated by the Rensselaer Water Company and was completed and first put into operation in 1901, the supply being obtained from the Hudson river. Purification was then provided by means of gravity mechanical filters only. Later, in 1911, the plant was equipped with apparatus for sterilizing the water with hypochlorite of lime, and in January, 1917, apparatus was installed for treating the supply with liquid chlorine. The water is pumped from the river by low lift pumps into coagulating basins, whence it flows by gravity through the purification plant into a clear water well. From the clear water well the water is pumped by high duty pumps through the distribution system into a storage reservoir located on a hill just east of the city. Practically all of the people of the city are served with the water, there being in all about 2,000 service taps, 50 per cent of which are metered. The average daily water consumption is approximately 1,550,000 gallons, the maximum 2,500,000 gallons and the minimum about 1,200,000 gallons. These figures corresponding to per capita rates of 137,208 and 100 gallons respectively. About 15 per cent of the average consumption is used for railroad and manufacturing purposes. Due to the heavy draft by the railroads, however, about 50 per cent of the water is used for other than domestic purposes at times of maximum consumption. There are in all some 20 miles of water mains ranging in size from 2 to 16 inches in diameter.

The reservoir into which the water is pumped from the purification plant is constructed by excavation and embankment, is concrete lined and has a capacity of about 5½ millon gallons. It is adequately protected from surface wash and is enclosed by a fence.

The pumping and purification plants are located in a brick building on the bank of the Hudson river in the northern edge of the city. There are two low lift centrifugal pumps, one having a capacity of 3,000,000 gallons and the other of 3,500,000 gallons per day. The high duty pumps consist of one 3,000,000 gallon compound duplex Laidlow Dunn-Gordon pump and two 1,500,000 gallon Worthington pumps. The pumps are now operated by steam power but arrangements are being made whereby electric equipment is to be provided. The steam power will be retained, however, as an auxiliary. In connection with this improvement the 3,500,000 gallon low duty pump is to be replaced by a new pump and one of the 1,500,000 gallon Worthington high duty pumps is to be replaced by a new 3,500,000 gallon two-stage centrifugal high duty pump.

The Hudson river above the intake has a total area of approximately 8,000 square miles, with a population of about 600,000, or an equivalent of 75 per square mile. The sewage from 500,000 of the inhabitants is discharged directly to the river and its tributaries. It is obvious, therefore, that the raw water is at all times grossly polluted.

The process of purification consists of coagulation with alum, sterilization with liquid chlorine, filtration through gravity mechanical filters and final sterilization with liquid chlorine. The water is pumped from the river into the coagulation basins, from which it flows by gravity through the filters to the clear water well. The coagulant is applied in the centrifugal pump before the water enters the coagulating basins and liquid chlorine is applied to the effluent from the basins and to the intake of the high duty pumps.

The coagulating basins, 4 in number, are 16 feet in diameter by 20 feet high, having a total capacity of about 120,000 gallons and giving a period of coagulation equivalent to about 1 hour. In addition to these, 6 of the filters have coagulating basins, located under the filter beds, 15 feet in diameter by about 5 feet deep, having a capacity of about 13,000 gallons each, thus giving an additional period of about ¾ hour. One and one-half to 2¼ grains of alum per gallon are used as a coagulant, the average being about 2 grains per gallon. The alum solution is prepared in 2 concrete tanks 5 feet in diameter by 5 feet deep. One bag of alum is placed in a slat tray which is immersed in the water of the tank and allowed to stand until the alum is dissolved and the solution ready for use. One tank is in operation while the solution is being prepared in the other. From the tank the solution flows by gravity to an orifice tank in which a constant head on the orifice is maintained by a float valve. By means of this orifice the flow of the solution is regulated so that the required amount of alum may be applied to the raw water. The amount of alum necessary is judged by the condition of the raw water with respect to color and turbidity.

The filters, 8 in number and 15 feet in diameter, are of the original type manufactured by the New York Continental Jewell Filtration Company. Six of these filters are of the high type, that is, with coagulating basins located beneath them. Two of more recent construction, however, are not provided with these basins. The filtering medium consists of about 2 feet of sand with an effective size of .48 mm. and a uniformity coefficient of 1.59. The strainers are of the standard continental Jewell type, connected with pipe underdrains. About 1½ feet of water is maintained over the sand of the filters.

The average rate of filtration is about 425,000 gallons per filter per day, which corresponds to a rate of about 105,000,000 gallons per acre per day. There is little variation in the rate of filtration, since the rate depends upon the capacity of the low lift pumps, which are operated on an average of about 10 hours per day. Furthermore, Weston controllers are provided in the six old filters and controllers of the Venturi type on the two new filters. The storage reservoir supplies the city when the pumps are not operating. The filters are washed by filtered water which is forced upward through the filters at a rate of about 1,200 gallons per minute per filter, or 6.8 gallons per foot of area. Agitation is provided by means of mechanical agitators. About 6½ per cent of the total water filtered is required for washing. The period of run between washings ranges from 6 to 12 hours and the time required for washing is about 5 minutes. All valves are operated by hand. The first filtrate after washing is wasted.

The clear water well is constructed of concrete, is located directly below the filters and has a capacity of about 100,000 gallons.

Two apparatus are provided for applying chlorine to the water, both of the Electric Bleaching Gas Company type. These apparatus are located in a small room on the operating floor of the filter but the absorption tower of the apparatus which applies chlorine to the effluent from the coagulation basins is located at an elevated position near the top of the building so as to give a gravity flow of the chlorine solution from the absorption tower to the point of application. Scales are provided on which the chlorine cylinders are placed and daily records are kept of the actual amount of chlorine applied as indicated by the scale readings. At the time of the inspection chlorine was being applied at a rate of 14 ounces per hour to the raw water and of 6 ounces per hour to the filtered water, or a total rate of 20 ounces per hour. These figures correspond to 0.84, 0.36 and 1.20 parts per million. Chlorine has been applied at a rate as high as 34 ounces per hour or 2.05 parts per million. It is aimed to apply the gas in an amount sufficient to cause a slight trace of residual chlorine in the water as indicated by the Tolidin test. As stated above, the chlorine plant was put into operation in January, 1917, and since this time little trouble has been experienced with its operation except that at one time, due to the collection of air in the pipes, the absorption tower feeding the chlorine solution to the raw water overflowed and the water backed up into the apparatus, thus causing considerable

damage. The danger of a recurrence of this trouble, however, has been obviated by inserting a trap valve in the line from the absorption tower to the point of application. The assistant engineer was informed that some complaints were received regarding tastes and odor in the water when the liquid chlorine was first applied, but that they had since subsided.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analysis, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show clearly the grossly polluted condition of the raw water. The bacterial results of analyses of the filtered water prior to 1911, during which time no sterilization was being used as an adjunct to filtration, indicate that ineffective purification was then being obtained. During this period colon bacilli were frequently present in the 10 c.c. and 1 c.c. inoculations and occasionally in the 1/10 c.c. inoculations, thus indicating the presence of active contamination. Since 1911, however, or since the application of hypochlorite to the water for sterilization, better results have been obtained. The bacterial counts in the treated water have been low and colon bacilli at all times absent in the samples collected.

The results of analyses of the samples collected at the time of the inspection indicate very efficient purification. The raw water contained 13,000 bacteria per c.c. with the B. coli type present in dilutions as small as 1/100 c.c., while the influent to the filters which had passed through the coagulation basin and been treated with liquid chlorine contained only 40 bacteria per c.c., with colon bacilli absent in all dilutions. These results show clearly the effectiveness of liquid chlorine as a disinfecting agent.

The effect of the sanitary quality of the water supply upon the typhoid fever death rate of the city is well shown by the following statistics: From 1898 to 1901, when raw Hudson river water was used, the average annual typhoid fever death rate was 102.6 per 100,000 population; from 1902 to 1910, when filtration was the only method of purification used, 46.1; and from 1911 to 1916, when in addition to filtration, hypochlorite of lime was used as a disinfecting agent, 7.6. These statistics show clearly the necessity of adequate purification of the water in order to properly protect the health and lives of the inhabitants of the city.

That sterilization is essential to produce satisfactory results is indicated by the fact that filtration alone reduced the typhoid fever death rate to 46.1 only, while the addition of sterilization reduced it to 7.6. Experience has shown that liquid chlorine is fully as efficient a disinfectant, if not more so, as hypochlorite of lime, which was formerly used. Furthermore, with modern apparatus the liquid chlorine is more easily handled and controlled. Chlorine is now being applied to both the unfiltered and filtered water, thus giving an additional safeguard; since hypochlorite was applied to only the filtered water.

In view of the above, it seems probable that with careful operation of the purification plant, water of a satisfactory quality should be delivered into the distribution system. It should be pointed out, however, that there is some danger of local contamination of the water in the mains through cross connections between the city supply and polluted auxiliary fire supplies of some 5 or 6 factories in the city. Contamination of water supplies in this manner has occurred in several other cities, and in fact epidemics of typhoid fever have been traceable to such contamination in some cases.

I would, therefore, recommend:

1. That the water company continue their careful supervision and operation of the purification plant.
2. That at the earliest practicable time a complete severance be made and maintained between the mains of the public water supply and the mains of all auxiliary fire supplies of unsafe sanitary quality.
3. That until recommendation No. 2 is carried out all connections and appurtenances between the public water supply mains and the auxiliary fire supplies be carefully inspected and tested at regular and frequent intervals in order that the danger of contamination of the public water supply from the auxiliary supplies may be reduced to a minimum.

Finally, I would recommend that copies of this report be sent to the local health officer, the sanitary supervisor of the district and to the water company.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 10, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL				
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			Bacteria per c.c.; gelatin 20°, 48 hours	B. COLI TYPE + = PRESENT − = ABSENT			
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
BEFORE STERILIZATION																								
Rensselaer	Rensselaer	Tap, filtered water	2/ 8/ 9																	400	+	+	−	....
Rensselaer	Rensselaer	Tap, filtered water	3/10/ 9																	110	+	+	−	....
Rensselaer	Rensselaer	Tap, filtered water	4/13/ 9	Tr.	Cl.						.008	.044	.002	0.30	1.15	1.37	28.6	2.5		12	−	−	−	....
Rensselaer	Rensselaer	Tap, filtered water	5/10/ 9	2	Cl.			57		40	.016	.040	Tr.	0.16	2.30	0.87	26.0	5.5		30	−	−	−	....
Rensselaer	Rensselaer	Tap, filtered water	6/14/ 9	2	Cl.						.004	.056	.003	0.04	4.50	1.62	39.0	19.0		140	+	−	−	....
Rensselaer	Rensselaer	Tap, filtered water	7/26/ 9																	120	+	+	+	....
Rensselaer	Rensselaer	Tap, filtered water	8/25/ 9	1	Cl.						.040	.052	.002	0.06	7.50	4.00	65.7	43.0		18	+	+	−	....
Rensselaer	Rensselaer	Tap, filtered water	12/21/ 9	1	Cl.			158		118	.130	.068	.003	0.20	9.10	4.75	69.3	64.0		1,400	+	+	+	....
HYPOCHLORITE APPLIED TO FILTER EFFLUENT																								
Rensselaer	Rensselaer	Raw water	1/20/13	25	90						.018	.150	.005	0.24	10.80	1.75	36.4	27.0		8,700	....	....	+	+
Rensselaer	Rensselaer	Treated water	1/20/13	Tr.	Cl.			77			.028	.046	Tr.	0.26	3.50	2.25	42.9	16.0		46	−	−	−	−
Rensselaer	Rensselaer	Raw water	3/ 6/13	20	80			95			.044	.114	.001	0.20	16.40	3.00	71.4	36.0		2,700	....	....	+	+
Rensselaer	Renssealer	Treated water	3/ 6/13	3	Cl.			105			.064	.058	Tr.	0.16	6.70	4.25	68.6	27.0		40	−	−	−	−
Rensselaer	Rensselaer	Raw water	4/16/13	15	12			73			.026	.122	.001	0.16	7.80	2.25	37.7	28.0		3,000	....	....	+	+
Rensselaer	Rensselaer	Treated water	4/16/13	Tr.	Cl.			75			.018	.026	Tr.	0.20	2.00	3.50	40.3	16.0		20	−	−	−	−
Rensselaer	Renssealer	Raw water	5/ 7/13	30	10			100			.006	.122	.010	0.08	10.40	2.25	48.6	37.0		8,600	....	....	+	....
Rensselaer	Rensselaer	Treated water	5/ 7/13	Tr.	Cl.			106			.008	.046	Tr.	0.08	5.20	2.87	48.6	25.0		4	−	−	−	....
Rensselaer	Rensselaer	Raw water	7/ 3/13	4	12			169			.022	.110	.010	0.04	15.80	5.63	61.4	61.0		6,700	+	+	+	....
Rensselaer	Rensselaer	Treated water	7/ 3/13	5	Cl.			139			.064	.092	.003	0.04	7.00	5.63	61.4	39.0		2	−	−	−	....
Rensselaer	Rensselaer	Raw water	4/ 7/14	35	10			91		54	.020	.146	.002	0.26	10.00	1.87	29.9	23.0		9,000	+	+	+	....
Rensselaer	Rensselaer	Treated water	4/ 7/14	Tr.	Tr.			84		51	.022	.050	.002	0.26	2.90	2.25	35.1	10.0		2	−	−	−	....
LIQUID CHLORINE APPLIED TO COAGULATED AND FILTERED WATER																								
Rensselaer	Rensselaer	Raw water	3/22/17	18	15						.062	.132	.010	0.12	9.00	3.75	56.4	47.5		13,000	....	....	+	+
Rensselaer	Rensselaer	Influent to filter No. 5	3/22/17																	40	−	−	−	....
Rensselaer	Rensselaer	Effluent from filter No. 5	3/22/17																	10	−	−	−	....
Rensselaer	Rensselaer	Final effluent of plant	3/22/17	Tr.	Cl.						.078	.050	.010	0.12	4.70	4.95	56.4	34.0		10	−	−	−	....

RENSSELAER (Mill of F. C. Huyck & Sons)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an inspection of the water supply system at the mill of F. C. Huyck & Sons, Rensselaer, made on March 21, 1917, by Mr. E. S. Chase, assistant engineer, in company with Dr. C. C. Duryee, sanitary supervisor, in connection with an investigation of the occurrence of several cases of typhoid fever among employees of this mill.

The mill is located in the western part of the city of Rensselaer, near the Hudson river and not far from the Greenbush bridge from Albany. This mill is engaged in the manufacture of paper maker's felt and employs approximately 425 hands about equally divided with respect to sex.

The water supply of the mill for general industrial purposes and for the toilets and lavoratories is derived from the Hudson river. A 16-inch pipe runs from the river to a pump well from which the water is pumped through two pressure mechanical filters, which provide no adequate purification as shown by analyses, and then through two units of Permutit Softeners, thence to a 50,000-gallon elevated tank from which it is distributed through the buildings to the toilets, lavoratories and washing machines. The fire sprinkler system is connected to the city mains and is also cross connected with the industrial water system. In case of fire the industrial supply can be pumped into the sprinkling system. There are three connections between the city mains and the mill fire service, each connection being provided with a single check valve and gate valve. The city pressure is about 125 pounds per square inch and the fire pump from the industrial supply is provided with a blow-off valve so set as to prevent pressure greater than 90 pounds being obtained from this source.

The drinking water supply is obtained from a drilled well located in the eastern part of the factory. This well is about 200 feet deep, drilled through shale and is provided with a 6 or 8-inch casing inside of which is a 4-inch pipe through which a deep well pump operates, the plunger being located at the bottom of the well. Water from this well is piped throughout the mill for drinking purposes only and numerous and convenient drinking fountains are provided at various points. The well water although usually showing low bacterial counts, is impregnated with hydrogen sulphide and is accordingly somewhat unpalatable. The samples of this water collected at the time of the inspection were comparatively high in bacteria and organisms of the B. coli type were moderately prevalent.

As a result of the somewhat unpleasant taste and odor, it is stated, some of the employees do not drink from this well supply but use or have used water from the industrial supply. It is further stated that all of the recent cases of typhoid are known to have used the industrial water for drinking purposes. In view of the seriously contaminated and unsafe condition of the industrial supply it is evident that the typhoid infection was received from the drinking of this water. It does not seem necessary, therefore, in this report to enter into a detailed discussion of the epidemiological features of this outbreak, the evidence being so clear as to the causation of the disease.

The location of the deep well, however, is somewhat unsatisfactory with reference to possibility of pollution of the tributary ground water by leakage from street or mill sewers. Its freedom from contamination depends upon factors of indeterminate effectiveness, such as the purifying effect of the soil, the tightness of the well casing, the adequacy of the protection of the well from surface water leaking down along the outside of the casing and the imperviousness of the strata separating the deep seated and presumably safe water from the undoubtedly contaminated subsurface water. The possibility of securing safe and satisfactory water from other wells sunk in this vicinity is, therefore, somewhat problematical.

The public water supply of the city of Rensselaer is derived from the Hudson river and is sterilized with liquid chlorine, filtered through gravity

mechanical filters and again sterilized with liquid chlorine. A series of analyses of this supply, covering several years, made by the Department indicate satisfactory purification and such results should be obtained so long as the purification plant is operated carefully and effectively. Some objections are made to drinking the city water on account of occasional taste and odors due to the chlorine used in the purification process. The amount of chlorine used is so minute as to be of no detriment to health. The city supply is the most satisfactory of those available at this mill.

In view of the above conclusions, I would make the following recommendations, to be acted upon by F. C. Huyck & Sons:

1. That steps be taken as soon as possible to render the industrial supply absolutely unavailable for drinking by abandoning its use for lavatory fixtures and for other purposes and at other points where it would be available for drinking water.
2. That the city water be substituted for the industrial supply as a source of water for the lavatory system.
3. That the city authorities of Rensselaer require complete physical severance from the city mains of all auxiliary fire systems on the supplies from polluted sources.
4. That in view of the somewhat unsatisfactory location of the deep well the company continue to have regular analyses made of this supply but in case active contamination be found at any time steps be taken to discover and eliminate the source of such contamination or if such contamination cannot be eliminated abandon the well and obtain the drinking water supply from the public supply.
5. That, in addition to recommendation No. 1, at those points where the industrial water is used in the manufacturing processes suitable signs be maintained, as at present, prohibiting its use for drinking purposes, and, if necessary, other measures be taken to enforce the prohibition.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *April* 3, 1917

REPORT OF WATER ANALYSES FOR HUYCK'S MILLS, RENSSELAER

Source		Raw water, Hudson river	Mill supply filtered	Deep well at pump	At drink fountain
Collected on		3/21/17	3/21/17	3/21/17	3/21/17
Bacteria per c. c		9,200	2,500	230	450
B. coli type	10 c.c.	3+0—	3+0—	3+0—	2+1—
	1 c.c.	3+0—	3+0—	0+3—	0+3—
	1/10 c.c.	3+0—	3+0—	0+3—	0+3—
	1/100 c.c.	3+0—	.....	.....	.....

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

RENSSELAER COUNTY TUBERCULOSIS HOSPITAL

(Plans for water supply and sewage disposal, see sec. 1a, p. 132.)

RENSSELAERVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report of an investigation of the public water supply of Rensselaerville made by Mr. C. M. Baker, assistant engineer, on October 15, 1917.

Rensselaerville is an unincorporated village of 150 or 200 inhabitants located in the southwestern part of Albany county in the town of Rensselaerville. It is about 25 miles southwest of Albany and 15 miles southwest of Voorheesville on the West Shore Railroad, the nearest railroad station. Ten-Mile creek, a tributary to Catskill creek, flows through the village.

The water supply is owned and controlled by the Rensselaerville Water Company, of which Mr. C. L. Andrus of Stamford, N. Y., is president and Mr. B. F. Bell of Rensselaerville, superintendent. The water is obtained from the outlet of Myosotis lake at a point just below the lake. From the intake the water flows through a crude gravel filter, thence through a charcoal filter into a distributing reservoir, from which it flows by gravity to the village. The supply was first put into operation in 1897 or 1898, since when the only improvements have consisted of repairs and extensions to the distribution system.

About 50 per cent of the population is served with the water, there being in all 35 or 40 service taps, none of which are metered. There is about 1 mile of water mains which range in size from 3 to 6 inches in diameter. The pressure in the village is 80 to 85 pounds per square inch. The intake consists of a wooden intake basin protected by a screen and located near the creek. From this intake basin the water flows to a small roughing filter which consists of a gravel bed underlaid by collecting tile, the collecting tile discharging into a receiving basin. From this receiving basin the water flows by gravity to a charcoal filter and the distributing reservoir located about ¼ mile below the intake.

The watershed tributary to Myosotis lake is about 7 square miles in area and has a total population of about 100 persons or 21 per square mile. The area of the lake itself is about 1/10 square mile. The watershed is hilly and a large portion is wooded. While a complete inspection was not made of the watershed, it is apparent from the topographic map and from inquiries made

at the time of the inspection that the houses are located well back from the stream. An inspection was made, however, in the vicinity of the lake. About the lake there are 6 or 7 summer cottages which are located from 50 to 100 feet from the water's edge. These cottages are provided with privies with earth vaults only, which are located 100 to 150 feet from the edge of the water. Campers also frequent the shores of the lake during the summer season.

It is apparent from the above that the lake is subject to considerable pollution during the summer season but that there is much less danger of pollution during the winter months.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table. The results of these analyses show a water slightly colored but clear at the time of the inspection. The figures for nitrogen in its various forms are moderate. The bacterial count was moderate for a surface supply but colon bacilli were found present in all 3 of the 10 c.c. inoculations, thus indicating the presence of a certain amount of active contamination.

As the result of this investigation it may be concluded that the public water supply of Rensselaerville is obtained from a source which is subject to considerable pollution during the summer months but which is comparatively free from pollution during the winter season.

In view of the above, I beg to offer the following recommendations to be acted upon by the water company:

1. That apparatus be provided and that the supply be sterilized with liquid chlorine during the months when the lake and its shores are used for pleasure purposes and that this treatment be continued for some time after the summer season in order to prevent residual contamination finding its way into the supply, or
2. That a new supply be developed from another source free from pollution.

Finally, I would recommend that copies of this report be sent to the water company, to the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *December* 31, 1917

REPORT OF WATER ANALYSES FOR RENSSELAERVILLE

Source		Creek at intake	Tap in village
Collected on		10/15/17	10/15/17
Color		.....	15
Odor, hot		.....	1 v.
Odor, cold		.....	2 v.
Ammonia, free		.....	.008
Ammonia, albuminoid		.....	.134
Nitrites		.....	.005
Nitrates		.....	.040
Oxygen consumed		.....	4.2
Chlorine		.....	1.5
Hardness, total		.....	29.9
Alkalinity		.....	26.0
Bacteria per c.c.		500	200
B. coli type	10 c.c.	3+0—	3+0—
	1 c.c.	1+2—	0+3—
	1/10 c.c.	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

ROCHESTER & LAKE ONTARIO WATER CO.

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to report that in response to requests from several health officers of municipalities supplied by the Rochester and Lake Ontario Water Company who had been disturbed by a notice circulated in the public press by the health officer of the city of Rochester to the effect that the water supplied by this company was unsafe for drinking purposes and advising that it be boiled, a reinvestigation of this supply was made by our assistant engineer, Mr. E. S. Chase, on September 13, 1917, a previous investigation having been made in 1915, a report of which will be found published in full in the 1915 Report of the Department, Volume II, beginning with page 576.

During the present investigation the plant was fully inspected and laboratory analyses made of the water from the various points of intake in the lake to the final effluent as delivered to the consumer. Four samples of water taken by Mr. Chase from different points of this supply on September 13, together with one taken by the health officer at East Rochester on August 16 and one taken by the health officer of the town of Pittsford on September 11, showed the absence of B. coli. These results taken in connection with the improved condition of the raw water and improvements in installation and operation of the plant indicate that the water supply furnished by the company on those dates was of good sanitary quality and safe for drinking purposes.

Without venturing a definite opinion as to the cause of the discrepancy between our several findings and those upon which the health officer of Rochester based his conclusions, it may be suggested as a cause therefor that whereas the bacteriological analysis made by the State Department of Health laboratory was conclusive as to the character of organisms present, the bacteriological evidence of the character of organisms said to have been found by the bacteriologist of the department of health at Rochester was only presumptive.

Very truly yours,

M. NICOLL, JR.,
Deputy Commissioner of Health

ALBANY, N. Y., *September* 24, 1917

SCHENECTADY

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of the city of Schenectady made by Mr. C. M. Baker, assistant engineer, on May 17, 1917.

Schenectady is a city with an estimated population of about 90,000 located on the Mohawk river and the New York Central and West Shore Railroads about 17 miles northwest of Albany. There are many manufacturing concerns in the city, the largest of which are the General Electric Company and the American Locomotive Company. Sewerage is provided by means of a municipal sewer which collects the sewage and discharges into a purification plant, the effluent from which discharges into the Mohawk river.

The first public water supply was constructed in Schenectady about 1835 by a private concern. The water was then collected from springs and distributed through hollow logs to the consumers. This system, however, apparently became inadequate, and later, in 1866, the Schenectady Water Company was incorporated with a capital stock of $80,000. This company constructed a water system which was put into active service in 1872. The water for this

supply was pumped from an infiltration gallery 6 feet wide by 114 feet long located near the Mohawk river and was distributed by the Holly system. In 1885 the city purchased the plant of the Schenectady Water Company and soon after constructed intakes into the Mohawk river, from which the main source of supply was derived without purification. Due to the increasing contamination of the river, however, by the discharge of sewage from cities located above Schenectady, the search for a new supply was soon begun. In 1895, after a careful study of local conditions, the city constructed a large dug well near the River road about 1½ miles west of the city. This well furnished a satisfactory and abundant supply of water for some time. Two additional wells have since been constructed near the original one, however, and these with the original well constitute the present source of supply. This new supply was first put in operation in 1897. The water was then pumped by means of a Deane duplex vertical triple expansion steam pump having a capacity of 6,000,000 gallons per day through the distribution system into a 1,000,000-gallon elevated tank. With the rapid growth of the city, however, particularly on the higher elevation, it soon became necessary to install new pumps and to increase the pressure in the distribution system in order to supply these outlying districts. New turbine centrifugal motor-driven pumps were therefore installed in 1903 and 1904 and these supplied the city with water from the original well. An additional water tower of 2,000,000 gallons capacity was also erected and the 2 new wells were constructed.

The present water supply of Schenectady is therefore derived from dug wells located about 3.9 miles west of the city near the Mohawk river. From these wells the water is pumped through the distribution system into storage tanks, although the new storage reservoir was nearly completed at the time of the inspection and additional pumps were being installed. A number of people outside of the city are being supplied with the water, so that it is estimated that about 97,000 persons are now supplied with water from the city distribution system. There are in all 14,794 service taps, only about 7.2 per cent of which are metered. For the year of 1916 the average monthly consumption was 339,433,750 gallons, the weekly average 78,330,865, and the daily consumption 11,359,465. The average daily per capita rate during this period was 114.9 gallons. There are in all about 117 miles of mains, ranging from 4 inches to 36 inches in diameter. The mains from the pumping plant to the city consist of one 24-inch cast iron main, installed in 1895, one 36-inch riveted steel main, installed in 1903 and 1904, and one 36-inch lock bar steel main installed in 1914, but not yet put into operation. The average pressure in the city at the present time is about 95 pounds per square inch.

The pumps are located in a brick building and consist of three induction motor-driven centrifugal pumps, two turbine and one volute with a combined capacity of about 31,500,000 gallons daily. Pumps No. 1 and 2 are Worthington centrifugal pumps, one with a capacity of 9,500,000 gallons and the other 13,500,000 gallons daily. They are driven by General Electric motors. The third pump is an I. P. Morris, 8,500,000 gallons centrifugal pump, also driven by a General Electric motor. Electric power is obtained from the General Electric Company at a rate of $6.50 per million gallons of water pumped. Power is transmitted to the pumping plant by means of four separate transmission lines. In connection with the new developments, one new I. P. Morris 7,500,000 gallon two stage vertical volute centrifugal pump and two Alberger two stage vertical turbine pumps, each having a capacity of 12,000,000 gallons daily, are to be installed.

The new reservoir, located on Bevis Hill, is constructed of concrete in excavation and embankment and is covered with a roof. This reservoir is 520 feet by 260 feet in plan, and 22 feet deep, is divided into two compartments and has a total capacity of 21,123,000 gallons. Although the reservoir is completed the main from the pumping station to it is not yet ready for service, due to repairs necessary to eliminate numerous leaks which occurred when this main was first put into service. In connection with the new development the city will be supplied with water by a two level system. One of the new pumps will pump water continuously into the lower level, while another

will pump into the upper level, the excess over consumption in this portion discharging into the storage reservoir. The upper and lower levels are connected by means of nine pressure reducing valves.

The original well of the present system, constructed in 1895, is 8 feet wide by 60 feet long and about 43 feet deep. The two additional wells constructed in 1903 are located near the old well and are each 47 feet in diameter by 40 and 44 feet deep respectively. The strata through which the wells are dug consist of 25 or 30 feet of clay, two layers of a cemented conglomerate, each of which is about 2 feet thick, and a coarse water bearing gravel, from which the supply is obtained. The water in the wells rises and falls with the elevation of the river, but this disturbance apparently does not affect the quality of the water. The wells are walled up with masonry and covered with masonry arches, located below the surface, the remaining excavation being filled in to conform to the general level of the ground.

Although it is impossible to determine with any degree of accuracy the collecting area tributary to these wells, the water probably comes from the hills located southwest of the plant. The only houses in the vicinity of the wells consist of the pumping plant and the house of the engineer in charge of the pumping equipment. A cast iron sewer from the plant and house, however, passes directly over the arch of well No. 1.

Since samples of water had been collected and analyzed by the Division of Laboratories and Research, just prior to the time of the investigation, samples were not again collected. The results of past analyses covering the years of 1912, 1913, 1914 and 1917 are recorded in the appended table. The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity, but a water that is high in hardness. The figures for nitrogen in its various forms are low, although the figures for chlorine are somewhat high. Due to the low nitrates, however, the high chlorine content is probably of mineral rather than animal origin. The bacterial counts are in all cases low and colon bacilli were present in only one 10 c.c. inoculation of the 15 samples tested.

As a result of this investigation it may be concluded:

1. That the water supply of the city of Schenectady as indicated by the present investigation and by past analyses appears to be of a satisfactory physical and sanitary quality.
2. That should leaks develop in the sewer that passes directly over well No. 1, contamination of the supply would probably result therefrom.

In view of the above, I beg to recommend:

1. That the city officials continue their careful supervision of the supply in order to maintain it in a proper sanitary condition.
2. That in order to minimize the danger of pollution of the supply in case leaks should occur in the sewer from the pumping plant, this sewer be relocated as far from the wells as possible.

In conclusion, I would recommend that copies of this report be transmitted to the health officer of the city of Schenectady, the superintendent of public works, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 11, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Schenectady	Schenectady	Tap, public supply	1/26/12	Tr.	Cl.	....	....	180	....	160	.024	.042	.001	0.26	0.60	3.37	131.4	1.26	10	−	−	−
Schenectady	Schenectady	Tap, public supply	3/12/12	Tr.	Cl.	....	....	191	....	171	.024	.040	Tr.	0.48	0.80	3.75	131.4	128.0	7	−	−	−
Schenectady	Schenectady	Tap, public supply	4/16/12	Tr.	Cl.	....	....	168	....	155	.002	.004	Tr.	0.36	0.60	3.75	148.6	121.0	2	−	−	−
Schenectady	Schenectady	Tap, public supply	5/24/12	Tr.	Cl.	....	....	274	....	223	.012	.014	Tr.	0.50	0.30	3.37	128.6	117.0	6	−	−	−
Schenectady	Schenectady	Tap, public supply	6/21/12	15	Cl.	....	....	195	....	183	.004	.008	.001	0.16	1.10	6.25	160.0	120.0	34	−	−	−
Schenectady	Schenectady	Tap, public supply	10/23/12	Tr.	Cl.	....	....	209	....	170	.010	.040	Tr.	0.14	1.10	5.50	142.8	137.0	6	−	−	−
Schenectady	Schenectady	Tap, public supply	12/12/12	Tr.	Cl.	....	....	186	....	172	.012	.038	Tr.	0.22	1.10	4.25	131.4	131.0	5	−	−	−
Schenectady	Schenectady	Tap, public supply	1/10/13	Tr.	Cl.	....	....	178	....	....	.016	.024	Tr.	0.28	0.50	4.00	122.8	119.0	6	−	−	−
Schenectady	Schenectady	Tap, public supply	2/17/13	Tr.	Cl.	....	....	170	....	....	.010	.044	.001	0.30	0.80	3.50	134.2	127.0	2	−	−	−
Schenectady	Schenectady	Tap, public supply	3/ 7/13	Tr.	Cl.	....	....	149	....	....	.000	.008	Tr.	0.30	0.60	3.50	148.6	125.0	2	−	−	−
Schenectady	Schenectady	Tap, public supply	4/25/13	Tr.	Cl.	....	....	167	....	....	.006	.002	Tr.	0.40	0.20	3.25	128.6	122.0	4	−	−	−
Schenectady	Schenectady	Tap, public supply	6/25/13	Tr.	Cl.	....	....	185	....	....	.004	.022	Tr.	0.26	0.20	3.50	128.6	127.0	2	−	−	−
Schenectady	Schenectady	Tap, public supply	4/10/14	Tr.	Tr.	....	....	192	....	170	.016	.016	.001	0.50	1.30	4.50	137.2	122.0	6	−	−	−
Schenectady	Schenectady	Tap, public supply	5/ 9/17	....	....	....	....	176	13	163	.018	.016	Tr.	0.10	1.90	4.50	122.8	121.0	5	−	−	−
Schenectady	Schenectady	Tap, public supply	5/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	−	−	−

SCHUYLERVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Schuylerville made by Mr. C. M. Baker, assistant engineer, on November 3, 1916.

Schuylerville is an incorporated village located in Saratoga county on the Hudson river, 30 or 35 miles north of Albany. It is on the Boston and Maine railroad and the Hudson Valley electric railroad. No sewer system is provided in the village, the houses being served by privies, cesspools, etc. The population of the village according to the 1915 census is 1,711.

The water supply is owned by the village and was first put into operation about 1904. It is derived from a small spring brook about one mile east of and on the opposite side of the river from the village. The brook intake diverts the water into a small reservoir near by from which it flows by gravity to a pumping station located in the village and also through the distribution system of the lower part of the village, the gravity pressure from the intake being sufficient for domestic purposes in this section. Water is pumped into a fire storage reservoir located on the hill just west of the village to supply the upper section and to furnish fire pressure. About 75 per cent of the population of the village is served with the water, also some outside consumers which makes the total population tributary to the water supply about 1,500 persons. There are in all 335 service taps nearly all of which are metered. The average water consumption is about 82,000 gallons daily and an equivalent of 55 gallons per capita served. The distribution system consists of about 6 miles of mains ranging in size from 6 to 12 inches in diameter. In the lower part of the village the gravity pressure from the intake is about 45 pounds while the fire pressure ranges from 85 to 100 pounds per square inch.

At the intake a concrete channel and diverting dam have been constructed in the bed of the brook which diverted the water through an iron grating, consisting of ¾-inch bars spaced with openings of about ¾ inch, into a circular concrete reservoir. This reservoir is 40 feet in diameter by 14 feet deep and has a capacity of 135,000 gallons. On top of the wall forming it is a ¼-inch mesh wire fence. The pumping equipment is housed in a brick building and consists of one 25-horsepower gasoline engine which operated a Rumsey triplex double acting pump direct connected with the engine and having a capacity of 24,000 gallons per hour. The fire reservoir, which is located on the hill just west of the village, is constructed of concrete, is 60 feet in diameter by 14 feet deep and has a capacity of about 300,000 gallons. It is also protected by a wire fence similar to that of collecting reservoir.

The source of the stream from which the supply is derived consists of springs, which issue from the foot of the steep bank of a ravine above which is a comparatively level table land which extends to within about 1,000 feet of the intake. The watershed tributary to the supply is about 0.3 of a square mile in area. On it are located two houses and a population equivalent to about 33 persons per square mile. The soil is very sandy and the land is used almost exclusively for agricultural purposes most of it being under cultivation. The soil is at times heavily fertilized with manure from the nearby farms. It seems quite probable, therefore, that the supply at times receives pollution due to surface wash from this land. It is possible, however, that this could be obviated to a considerable extent if not entirely by the construction of suitable drainage ditches at the foot of the table land along the top of the steep slopes to divert the surface wash. The village has the right to use water but so far as could be learned by the engineer making the inspection its control of the watershed is limited. It was stated, however, that no cattle are pastured in the immediate vicinity of the brooks tributary to the supply.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses. the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water at times rather highly colored, and occasionally somewhat turbid. It is high in hardness. The figures for nitrogen in the form of free and albuminoid ammonia are at times rather high as are also the figures for nitrates and chlorine thus indicating that pollution finds its way into the supply. The bacterial counts are at times high and colon bacilli are prevalent in the 10 c.c. inoculations, frequently present in the 1 c.c. and occasionally in the 1/10 c.c. inoculations, thus indicating the presence of active and potentially dangerous contamination.

As a result of this investigation it may be concluded that the water supply of Schuylerville is derived from a source which is subject to considerable pollution from manure used as a fertilizer on agricultural land tributary to the supply.

In view of the above, I beg to offer the following recommendation to be acted upon by the village authorities:

That steps be taken immediately to protect the sanitary quality of the supply by:

(a) The construction of suitable drainage ditches to prevent surface wash from fertilized fields reaching the supply directly, or

(b) The purification of the supply by sterilization with liquid chlorine or by adequate filtration.

Regarding the sterilization of the supply with liquid chlorine it should be pointed out that this will not improve its physical qualities but will only render it satisfactory from a sanitary standpoint. If it is desired to improve the physical qualities of the water as well as the sanitary, filtration should be provided.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 25, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Schuylerville...	Saratoga.....	Tap, public sypply.....	2/ 3/10	3	Tr.	....	....	115	....	85	.012	.012	.002	0.50	1.20	0.75	81.4	80.0	110	−	−	−
Schuylerville...	Saratoga.....	Tap, public supply.....	9/15/10	Tr.	Cl.	....	....	127	....	100	.008	.024	.001	0.60	0.40	0.75	92.9	92.0	1,800	+	+	−
Schuylerville...	Saratoga.....	Tap, public supply.....	12/ 1/10	5	Cl.	....	....	125	....	97	.006	.022	.002	0.50	0.70	0.50	97.1	96.0	50	−	−	−
Schuylerville...	Saratoga.....	Tap, public supply.....	2/ 7/11	Tr.	Cl.	....	....	121	....	100	.012	.094	.001	0.60	0.80	1.00	98.6	98.0	60	−	−	−
Schuylerville...	Saratoga.....	Tap, public supply.....	4/26/11	Tr.	Cl.	....	....	112	....	91	.006	.014	.002	0.20	0.20	1.50	90.0	89.0	30	+	−	−
Schuylerville...	Saratoga.....	Tap, public supply.....	7/ 6/11	Tr.	....	....	....	142	....	115	.002	.020	.001	0.50	0.90	0.75	98.6	95.0	600	+	−	−
Schuylerville...	Saratoga.....	Tap, public supply.....	8/31/11	5	Tr.	....	....	130	....	106	.006	.014	.001	0.50	2.00	1.50	105.8	103.0	400	−	−	−
Schuylerville...	Saratoga.....	Tap, public supply.....	10/ 3/11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	300	+	+	−
Schuylerville...	Saratoga.....	Tap, public supply.....	12/15/11	Tr.	Cl.	....	....	139	....	127	.006	.062	Tr.	0.50	0.60	0.50	100.0	98.0	300	+	+	−
Schuylerville...	Saratoga.....	Tap, public supply.....	1/31/12	Tr.	Cl.	....	....	125	....	105	.020	.026	.001	0.68	0.20	0.50	100.0	94.0	40	+	+	−
Schuylerville...	Saratoga.....	Tap, public supply.....	3/12/12	Tr.	Cl.	....	....	117	....	106	.018	.018	Tr.	0.68	0.30	1.00	97.2	90.0	40	+	+	−
Schuylerville...	Saratoga.....	Tap, public supply.....	4/19/12	Tr.	Cl.	....	....	116	....	110	.006	.032	.001	0.48	0.20	0.87	105.8	95.0	60	+	+	−
Schuylerville...	Saratoga.....	Tap, public supply.....	9/17/12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	500	+	+	+
Schuylerville...	Saratoga.....	Tap, public supply.....	11/13/12	10	Tr.	....	....	131	....	120	.010	.048	.002	0.60	1.30	1.00	120.0	101.0	20	−	−	−
Schuylerville...	Saratoga.....	Tap, public supply.....	12/28/12	Tr.	Cl.	....	....	119	....	103	.016	.010	.001	0.70	0.70	1.00	100.0	93.0	80	+	−	−
Schuylerville...	Saratoga.....	Tap, public supply.....	2/19/13	Tr.	Cl.	....	....	122	....	....	.014	.038	.001	0.60	0.40	1.00	108.6	94.0	60	+	−	−
Schuylerville...	Saratoga.....	Tap, public supply.....	4/25/13	30	3	....	....	56	....	....	.006	.056	.001	0.08	9.10	0.50	24.7	11.0	1,300	+	+	+
Schuylerville...	Saratoga.....	Tap, public supply.....	6/28/13	35	5	....	....	102	....	....	.008	.134	Tr.	0.10	19.4	1.25	40.3	26.0	200	+	+	+
Schuylerville...	Saratoga.....	Tap, public supply.....	4/ 9/14	5	12	....	....	149	....	124	.008	.024	.001	0.36	0.80	1.00	92.0	.....	850	+	+	−
Schuylerville...	Saratoga.....	Brook inlet to reservoir.....	11/ 3/16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1,100	3+0−	0+3−	0+3−
Schuylerville...	Saratoga.....	Tap, in village.....	11/ 3/16	Tr.	Tr.	....	....	....	....	....	.002	.004	Tr.	0.60	0.15	1.00	97.2	96.0	130	2+1−	0+3−	0+3−

SCOTIA

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Scotia made by Mr. C. M. Baker, assistant engineer, on May 18, 1917.

Scotia is an incorporated village of 3,790 inhabitants located on the north side of the Mohawk river nearly opposite the city of Schenectady. It is on the New York Central and Hudson River R. R. and may also be reached by trolley from Schenectady. The village is equipped with a municipal sewer system, the effluent from which at present discharges into the Mohawk river without purification. Revised plans for sewage disposal works, however, have recently been submitted to and approved by this Department and the works are required to be constructed by October 1 of the present year.

The public water supply is derived from wells located about two miles northwest of the village and is owned and operated by the village. The system was designed by Prof. O. H. Landreth, consulting engineer, and was installed and put into operation in 1905. Since the original installation extensions have been made to the mains, more complete equipment for the pumping station has been provided and at the time of the inspection a residence was being constructed near the pumping station for the engineer.

All of the village and some 200 to 250 persons outside are served with the water, the total population served by the supply being estimated at the time of the inspection to be about 4,200. The total consumption ranges from 200,000 to about 233,000 gallons daily which corresponds to per capita rates of 48 to 55 gallons per day. There are in all some 13½ miles of mains ranging from 4 to 12 inches in diameter. Two 12-inch force mains are provided from the pumping station to the distribution system. In all there are 902 service taps, 12 or 14 of which, however, are in use only a part of the year. All services are metered. The pressure in the village ranges from 65 to 75 pounds per square inch.

From the wells the water is pumped through the distribution system into a tank located on a tower in the western part of the village. The wells, 7 in number, are 4 inches in diameter and range from 40 to 60 feet deep. The strata through which they are drilled consist of gravel with an occasional intermittent stratum of clay. The wells are placed in a line and are spaced about 30 feet apart. A short tunnel leads from each of the wells toward the pumping station into another tunnel running at right angles to those from the wells, in which is located the suction lines from the pumps, the pipes from the wells thus being connected through this tunnel to the suction lines. The wells are 20 or 25 feet from the pumping station. There appears to be no opportunity for surface wash to find its way directly into the wells. A study of the topography in the vicinity indicates that the principal source of water tributary to the wells is seepage from a small brook that rises in the Glenville hills about 4 miles north. The brook flows in a southerly direction until nearly opposite the wells where it swings to the east its course being diverted by a ridge on the edge of which the wells are located. The minimum distance between the stream and the wells is 600 or 700 feet.

The pumping station is located in a brick building and is equipped with two Worthington centrifugal pumps each with a capacity of 35,000 gallons per hour. Power is furnished by two 50-horsepower General Electric motors. The pumps are located in a concrete pit about 15 feet below the elevation of the floor of the pumping station. Storage is provided by the elevated steel tank, the bottom being about 120 feet above the ground. The capacity of this tank is approximately 100,000 gallons. The pumps are operated during the day for a sufficient length of time to maintain a proper supply of water in the storage tank, the average run during each day being about 4½ hours. The reservoir was cleaned about a year ago after a period of about 10 years without cleaning and very little sediment was found. During the summer the dead ends of the mains are flushed once or twice weekly.

There were no apparent sources of pollution in the vicinity of the well at the time of the inspection. In connection with the construction of the new

house for the engineer, however, it is planned to construct a leaching cesspool at a point about 230 feet from the nearest well. While it is difficult to predict the exact effect such a cesspool would have upon the sanitary quality of the well supply, it is very possible that at times of excessive draft or other unusual hydraulic condition of the ground water active pollution would reach the ground water tributary to the wells and bring about serious contamination of the supply. The direct discharge of sewage into the ground within such a comparatively short distance from the wells must, therefore, be considered as potentially unsafe.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but a water that is high in hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low but those for nitrates and chlorine appear to be somewhat above normal thus indicating that pollution finds its way into the ground water tributary to the supply. The bacterial counts are exceptionally low, however, and colon bacilli were in no case found present in the dilutions tested thus indicating the absence of active contamination. Nevertheless should the cesspool be constructed at the location planned, it is possible that pollution from it may, as pointed out above, find its way into the supply.

As a result of this investigation it may be concluded:

1. That the water supply of Scotia is derived from a source which, as indicated by the sanitary surroundings and by analyses, furnishes a satisfactory supply of water.
2. That, however, should the cesspool be constructed as planned it is possible that pollution from it may at times affect the sanitary quality of the supply.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities.

1. That the present careful supervision be continued in order that the supply may at all times be maintained in a satisfactory sanitary condition.
2. That, to prevent the possibility of pollution, the cesspool proposed in connection with the dwelling of the engineer be made watertight and that the contents from it be properly disposed of at a point remote from the wells or that other suitable means of disposal be provided elsewhere at a point not less than 500 feet from the nearest well.

In conclusion I would recommend that copies of this report be transmitted to the local health officer and other village officials, also to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 28, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Scotia	Schenectady	Tap, public supply	1/26/12	Tr.	Cl.			167		133	.024	.024	.001	1.20	0.10	3.00	108.6	100.0	7	—	—	—
Scotia	Schenectady	Tap, public supply	3/12/12	Tr.	Cl.			179		154	.018	.052	Tr.	1.50	0.20	3.25	131.4	108.0	2	—	—	—
Scotia	Schenectady	Tap, public supply	4/16/12	Tr.	Cl			146		135	.008	.004	Tr.	1.20	0.20	3.00	111.4	96.0	5	—	—	—
Scotia	Schenectady	Tap, public supply	5/24/12	Tr.	Cl.			168		135	.004	.010	Tr.	1.08	0.10	2.87	101.5	89.0	4	—	—	—
Scotia	Schenectady	Tap, public supply	9/21/12	Tr.	Cl.			194		169	.008	.016	.003	1.70	0.60	3.75	117.2	106.0	10	—	—	—
Scotia	Schenectady	Tap, public supply	10/23/12	Tr.	Cl.			200		150	.012	.042	Tr.	1.52	0.30	2.75	122.8	103.0	2	—	—	—
Scotia	Schenectady	Tap, public supply	12/12/12	Tr.	Cl.			162		144	.014	.038	Tr.	1.00	0.70	2.50	128.6	96.0	3	—	—	—
Scotia	Schenectady	Tap, public supply	1/10/13	Tr.	Cl.			165			.032	.014	Tr.	0.80	0.10	3.00	111.4	90.0	10	—	—	—
Scotia	Schenectady	Tap, public supply	2/17/13	Tr.	Cl.			151			.010	.026	.001	0.70	0.60	2.87	120.0	92.0	2	—	—	—
Scotia	Schenectady	Tap, public supply	3/ 7/13	Tr.	Cl.			200			.004	.008	Tr.	1.10	0.30	3.00	171.4	95.0	1	—	—	—
Scotia	Schenectady	Tap, public supply	4/25/13	Tr.	Cl.			164			.004	.008	Tr.	0.70	0.10	2.75	117.2	89.0	3	—	—	—
Scotia	Schenectady	Tap, public supply	6/23/13	Tr.	Cl.			188			.010	.016	Tr.	1.20	0.10	3.75	117.2	97.0	2	—	—	—
Scotia	Schenectady	Tap, public supply	4/10/14	Tr.	Tr.			175		149	.004	.010	.001	0.90	0.50	2.75	125.8	98.0	2	—	—	—
Scotia	Schenectady	Tap, public supply	5/18/17				2 a.				.001	.008		0.60	1.30	4.00	102.8	95.0	5	—	—	—

SILVER SPRINGS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Silver Springs made by Mr. C. M. Baker, assistant engineer, on August 3, 1917.

Silver Springs is an incorporated village of 895 inhabitants, located in Wyoming county at the junction of the B. R. & P. R. R., with the Hornell-Buffalo branch of the Erie railroad, 53 miles southeast of Buffalo and about the same distance southwest of Rochester. It is on Wolf creek, a tributary of the Genesee river. No sewerage system is provided, the house being served by privies, cesspools, etc.

Formerly the village was supplied with water by the Castile Water Company. In 1904, however, the village developed a supply of its own from springs located about 1 mile southwest of the village. From the springs the water flows to a storage reservoir thence by gravity to the village. Since the original development, however, this supply has been increased by water from two additional groups of springs and also by water pumped from artesian wells located in the northern edge of the village. As now developed, therefore, the supply is derived from three groups of springs located from 1 to 1½ miles southwest of the village while an auxiliary supply is pumped from artesian wells in the northern edge of the village.

Practically all of the population of the village is served with the water, there being in all some 200 service taps, none of which are metered. The distribution system consists of 8 or 9 miles of mains, ranging in size from 4 to 8 inches in diameter. The average pressure is approximately 75 pounds per square inch. An auxiliary supply for fire protection can be obtained by means of a cross connection with the large salt plant located in the village, the supply being obtained from a pond fed by springs and wells. Although, due to lack of time, no personal inspection was made of this supply by the assistant engineer, inquiry regarding its sanitary quality failed to disclose any sources of pollution. No occasion has yet arisen, however, to require the admission of water from this source into the village distribution system.

The pumping equipment for the auxiliary well supply is located in a brick building and consists of an air compressor by means of which the water is forced from the wells into a 20,000 gallon wooden storage tank located nearby whence an electrically driven 500,000 gallon centrifugal pump forces the water into the distribution system. Power is furnished by a 45-horsepower producer gas engine which also operates a dynamo that furnishes electricity for the village. The storage reservoir is located on a hill about ¾ of a mile southwest of the village, is constructed of concrete and covered, and has a capacity of about 400,000 gallons.

The original springs from which the supply was derived, known as the Kershaw springs, consist of a series of collecting tile in low marshy land which collect the water and convey it into a receiving basin whence it flows by gravity to the storage reservoir near which they are located. The receiving basins, 2 in number, are constructed of concrete and are provided with wooden covers. Only one of the collecting basins, however, could be located at the time of the inspection. The collecting tile are very close to the surface in a number of places and in fact in some places are exposed, as a result of which surface wash frequently finds its way directly into the supply through the loosely constructed joints of the tile. The land in the vicinity is used as pasture.

One spring, known as the railroad spring, which has been added to the original sources of supply is located about 1 mile south of the storage reservoir near the B. R. & P. R. R. This spring consists of a wooden tub or barrel sunk into the bank about 8 feet from the railroad track. The spring is covered with earth and could not be definitely located at the time of the inspection. A leak in a drain tile located directly under the track and which drains a swamp some distance above forms a small stream of water that flows between the railroad and the spring. It is quite possible that the top of the

barrel protecting the spring is below the level of this water. In any event the exact location of the spring should be determined and it should be more satisfactorily developed. The water from this spring flows by gravity directly to the storage reservoir.

Two other springs added to the original sources of supply are in this same locality and are known as the Cook springs. They are located in pasture land and are protected by wooden curbs sunk into the ground and by wooden covers. These springs are located near the railroad and are apparently frequently used by visitors in the vicinity since a cup for obtaining water hung inside the curb of one of the springs and there was other evidence of visitors thereto. The other spring is located in the bed of a small stream and undoubtedly at times receives considerable surface wash. The water from these springs flows into a wooden tank in an old abandoned pump station located nearby, thence to the storage tank at the pump station of the auxiliary supply in the village. The tank in the abandoned pump station leaks badly and is unprotected from visitors.

The wells, two in number, from which the auxiliary supply is derived, are located near the railroad in the northern edge of the village, one is 200 feet deep and is a flowing well, while the other, which is located further up on the side of the hill, is 225 feet deep and does not flow. Information regarding the strata through which the wells are drilled was somewhat indefinite but the strata appear to consist of varying layers of gravel and clay to a rock formation, the water being obtained just above the rock.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water at times colored and slightly turbid; also a water very high in hardness. The figures for nitrogen in its various forms are moderate but those for chlorine are at times very high. The bacterial counts are occasionally high and colon bacilli are frequently found present in 10 c.c. inoculations and occasionally in 1 c.c. inoculations, thus indicating the presence of active and potentially dangerous contamination.

Regarding the different sources of supply, as indicated by the analyses of the samples collected at the time of the inspection, the well supply showed a water satisfactory in physical qualities with respect to color and turbidity but a water exceedingly hard. The figures for nitrogen in the form of free ammonia are high but those for albuminoid ammonia, nitrites and nitrates are low. The figures for chlorine are very high and are probably due to mineral deposits. The high chlorine in this water probably accounts to some extent for the high chlorine in the samples of tap water. The bacterial count in the well water was low and the B. coli type was absent. Samples of water collected from the reservoir and from the Cook spring show a water satisfactory in physical qualities with respect to color and turbidity at the time of the inspection but a water high in hardness. The figures for nitrogen in its various forms are moderate but those for chlorine, appear to be somewhat above normal. The bacterial counts are high and colon bacilli were found present in all three of the 10 c.c. inoculations and in two of the 1 c.c. inoculations of the samples collected from the storage reservoir also in all three of the 10 and 1 c.c. inoculations and in one of the 1/10 c.c. inoculations of the samples collected from the Cook springs. It is apparent from the above that the pollution indicated by analyses of the tap water is due to that carried into the springs by surface wash.

As a result of this investigation, it may be concluded:

1. That the various springs tributary to the public water supply of Silver Springs are subject to pollution by surface wash.
2. That these supplies are apparently not properly cared for by the village authorities since some of the sources could not be definitely located and the springs were all in need of cleaning and repairs.
3. That, however, the auxiliary supply obtained from wells appears to be of a satisfactory sanitary quality.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That each of the spring supplies be more adequately developed as follows:
   (a) By the construction about each spring of more suitable curbs provided with adequate covers and locks.
   (b) By enclosing a sufficient area about the springs with a suitable fence, to prevent access to the immediate vicinity of the springs.
   (c) By the construction of suitable drainage ditches within this area to divert surface wash.
   (d) By posting notices and otherwise endeavoring to prevent trespassing in the vicinity.
2. That regular inspections be made of all springs and that they be kept properly cleaned and their curbs and covers in proper repair.

In order to obtain the most satisfactory development of this supply it seems advisable that the village secure the services of a competent consulting expert to make a detailed study of the situation and to advise them as to the proper method to most satisfactorily develop the supply.

Finally I would recommend that copies of this report be sent to the various local officials and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 17, 1917

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RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—				Oxygen consumed	Chlorine	HARDNESS		Bacteria per c.c., gelatin 20°, 48 hours	B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates			Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
Silver Springs..	Wyoming.....	Tap, public supply.....	1/18/12	5	10	....	....	231	....	221	.020	.018	Tr.	0.24	1.20	1.75	188.5	182.0	90	+	−	−
Silver Springs..	Wyoming.....	Tap, public supply.....	3/11/12	20	5	....	....	113	....	77	.025	.180	Tr.	0.88	5.40	2.00	65.7	51.0	1,900	+	+	−
Silver Springs..	Wyoming.....	Tap, public supply.....	3/30/12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	60	+	+	−
Silver Springs..	Wyoming.....	Flowing well No. 2, public supply.....	4/20/12	5	Tr.	....	....	251	....	231	.122	.016	Tr.	Tr.	0.60	15.75	169.0	.....	.....	.....	.....	.....
Silver Springs..	Wyoming.....	Tap, public supply.....	11/30/12	Tr.	Cl.	....	....	245	....	213	.020	.040	.002	0.14	0.50	5.25	195.0	185.0	60	−	−	−
Silver Springs..	Wyoming.....	Tap, public supply.....	1/11/13	Tr.	Tr.	....	....	227	....	....	.040	.050	.004	0.50	0.90	6.25	175.5	168.0	100	+	−	−
Silver Springs..	Wyoming.....	Tap, public supply.....	3/8/13	2	Tr.	....	....	280	....	....	.005	.024	Tr.	0.24	1.20	2.00	214.0	169.0	190	−	−	−
Silver Springs..	Wyoming.....	Tap, public supply.....	4/18/13	5	Tr.	....	....	233	....	....	.005	.014	Tr.	0.30	0.50	1.87	194.2	102.0	250	−	−	−
Silver Springs..	Wyoming.....	Tap, public supply.....	6/6/13	Tr.	Cl.	....	....	220	....	....	.002	.005	Tr.	0.20	0.50	2.00	171.4	185.0	475	−	−	−
Silver Springs..	Wyoming.....	Artesian well No. 2.....	8/3/17	0	0	....	....	277	....	....	.334	.025	0	0.02	1.20	16.0	211.6	208.0	Iron .50 50	0+3−	0+3−	0+3−
Silver Springs..	Wyoming.....	Storage reservoir.....	8/3/17	0	0	1a	1a	....	....	....	.006	.030	0	0.24	2.70	2.50	165.8	161.0	800	3+0−	2+1−	0+3−
Silver Springs..	Wyoming.....	Cook spring.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.00	.....	.....	24,000	3+0−	3+0−	1+2−

SLINGERLANDS (Suburban Water Co.)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the sanitary condition of the water supply furnished by the Suburban Water Company to the villages of Slingerlands, Delmar, Elsmere, New Scotland and New Salem. This investigation was made by Mr. C. M. Baker, assistant engineer, on October 29, 1917, and was taken up subsequent to the occurrence of several cases of typhoid fever in Delmar.

General information

Location.— Along Delaware and Hudson railroad, in the towns of Bethlehem and New Scotland, Albany county, 4 to 10 miles southwest of Albany.

Population.— Estimated: Elsmere, 200; Delmar, 800; Slingerlands, 500; New Scotland, 100; and New Salem, 100; total, 1,700, about 40 per cent of which are served with the water.

Waterworks in charge of.— Suburban Water Company.

Source of supply.— Regular supply, spring at foot of Helderberg mountains; auxiliary supply, Albright's Cold spring in eastern part of village of New Salem.

Consumption.— Roughly estimated at 85,000 to 100,000 gallons per day.

Distribution system.— Gravity system, 16 miles of mains ranging in size from 2 to 6 inches in diameter.

Service taps.— Approximately 150, only a few of which are metered.

Pressure.— About 95 pounds per square inch.

Storage.— Intake basin 6,500 gallons. Storage reservoir 5,500,000 gallons.

Purification.— None.

References to previous investigations.— 1911, page 778, 32d annual report; 1915, page 647, 36th annual report.

At the time of the investigation made in 1915 it was pointed out that certain unsatisfactory conditions existed in connection with the supply, particularly with reference to the possibility of pollution of the auxiliary supply. As a result of these conditions the following recommendations were then made:

1. That the water company make every effort to prevent pollution by cattle or from other sources at the main spring and intake basins.
2. That the company move the privy in the rear part of the house near the Albright's Cold Spring further from the spring and some distance down the opposite slope of the hill. The rustic seat at the spring should also be removed or fenced to prevent its use and the opening in the stone at the spring should be closed to prevent chance contamination.
3. That the company clean the reservoir and springs as soon as possible chiefly by pulling up all of the chara and pond weed, in order that the plants may not be left in the reservoir to decay and also that those seeds which have not dropped may be removed.
4. That the company regularly clean the reservoir and spring each summer before the vegetable growths reach maturity.

The regular supply is derived from a spring issuing from the limestone formation at the foot of the Helderberg mountains. From the spring the water flows through one small reservoir into a second or intake reservoir located about one-eighth mile below the spring. The fence about the spring and reservoirs was opened on the side next to the road at the time of the inspection and a well defined path leads from the road to the spring. Furthermore,

there is a small summer cottage located just north of the spring from which a path leads through a gate in the fence to the spring. It is apparent, therefore, that this spring is frequented by visitors and that there is considerable danger of accidental, incidental or wilful pollution of the supply by them. Apparently the recommendations made in the previous report regarding improvements in this supply have not been carried out.

During the present year the auxiliary supply was put into service about August 10 and used practically continuously until October 27. This supply is obtained from a spring known as Albright's Cold spring, located on the eastern edge of the village of New Salem. A small masonry basin about 8 feet square is walled up about the spring. From this basin the water flows into a pond about 20 feet wide by 30 feet long from which the water is pumped into the main supplying the storage reservoirs and distribution system. Adjacent to the spring is a small well or basin covered with a flagstone with an opening in the center. This well, the engineer was informed, was formerly used for cold storage purposes by the people in the farm house nearby. Adjacent to the well or basin is a rustic seat. No adequate fence is provided about this spring and vicinity to prevent trespassing. The nearby farm house is about 100 feet from the spring and a privy provided with a loosely constructed wooden box vault is about 130 feet distant. The slope from the house is toward the spring and, although the privy is located on practically level ground from which the land slopes both toward and from the spring, an obstruction might cause drainage to flow from the privy toward the spring. A cesspool located on ground sloping toward the spring and about 90 feet from it receives the drainage from the kitchen sink at the farm house. Furthermore, the State road passes very close to the pond from which the supply is pumped and there is nothing to prevent drainage from the road reaching the supply. A driveway leading to the barn of the farm passes just west of the spring. These conditions are substantially the same as at the time of the preceding inspection, none of the recommendations regarding improvements having been carried out.

The storage reservoir is constructed by excavation and embankment, the embankment furnishing protection against surface wash. The reservoir is drained and cleaned every spring.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water high in hardness and at times somewhat high in color and turbidity. The figures for nitrates and chlorine are at times high, particularly in the samples collected from the Albright spring. Both samples collected from the Helderberg spring show high bacterial counts with colon bacilli present in all three of the 10 c.c. and 1 c.c. inoculations and in one of the three 1/10 c.c. inoculations; thus indicating the presence of considerable active contamination. Furthermore, the assistant engineer was informed that the water from this spring is turbid following a heavy rain storm. It appears, therefore, that surface water finds its way into this spring through fissures in the rock, the water probably flowing for some distance underground, however, before reaching the spring. There are few buildings on the mountain above the spring, and it is, therefore, probable that the pollution is of animal rather than of human origin. The presence of colon bacilli in the samples from the Albright spring is undoubtedly due to the insanitary conditions in the vicinity.

As a result of this investigation it may be concluded:

1. That the regular supply is subject to accidental, incidental or wilful pollution from visitors to the spring from which it is derived, also from surface water through fissures in the rock at times of storm.
2. That the auxiliary water supply of the Suburban Water Company is subject to considerable pollution of a potentially dangerous character from the nearby farm.

In view of the above I beg to offer the following recommendations to be acted upon by the water company.

1. In order to more adequately protect the regular supply:

(a) That an intake be provided at the spring where the water issues from the limestone formation and that this intake be enclosed by a substantial structure to prevent access to the water of the spring by chance visitors.

(b) That the water from this intake be conducted to a receiving basin which shall also be tightly constructed and enclosed so as to prevent access to visitors.

(c) That the water from this receiving basin be conducted through closed mains either to the storage reservoir or into the distribution system.

(d) That if these improvements do not satisfactorily improve the quality of this supply steps be taken to determine the source of the pollution and to protect the spring from them or that some method of purification be considered.

2. That in order to provide more adequate protection of the auxiliary supply:

(a) The nearby privy and cesspool be moved to a point at least 50 feet northwest of the house on land sloping away from the spring or preferably that the house be provided with running water and that adequate sewage disposal works consisting of settling tank and subsurface irrigation be provided at a point at least 100 feet northwest of the house and that the sewage be conducted from the house to the disposal plant through watertight cast-iron pipe.

(b) That the rustic seat near the spring be removed.

(c) That adequate drainage ditches be provided to divert all surface wash from the spring.

(d) That a suitable fence be constructed about the spring to prevent trespassing in the vicinity.

(e) That the present intake be extended so as to draw water directly from the spring and that the pond be abandoned as a source of supply.

It appears that considerable trouble has been experienced by the company in adequately protecting the main supply from trespassers who wish to get water from the spring. It seems that this difficulty could be obviated by providing a small overflow leading from the receiving basin to a suitable point some distance away where water might be obtained by visitors. In this way, if the enclosure about the spring and the receiving basin were properly constructed, visitors could be prevented from having direct contact with the supply.

Finally I would recommend that copies of this report be sent to the water company and the various local officials and the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *November* 13, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Slingerlands, Delmar, etc.	Albany	Helderberg spring	9/24/15	2	3	2v	2v	395	97	298	.022	.018	.003	0.30	2.50	1.50	243.0	172.0	340	3+0—	3+0—	1+2—
Slingerlands, Delmar, etc.	Albany	Albright spring	9/24/15	Tr.	Cl.	Iv.	Iv.	250	33	217	.004	.002	.003	1.60	1.80	2.00	160.0	119.0	55	3+0—	2+1—	0+3—
Slingerlands, Delmar, etc.	Albany	Tap, public supply	9/24/15	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	70	2+1—	0+3—	0+3—
Slingerlands, Delmar, etc.	Albany	Tap, public supply	5/21/17	20	25	2v	0	192	18	174	.014	.048	Tr.	.20	2.80	1.25	125.8	126.0	75	—	—	—
Slingerlands, Delmar, etc.	Albany	Tap, public supply	5/21/17	Tr.	10	2a	2a	183	22	161	.008	.020	0	.20	2.00	1.75	125.8	126.0	120	—	—	—
Slingerlands, Delmar, etc.	Albany	Helderberg spring	10/29/17	0	0	0	0	....	....	....	.010	.028	0	.70	.60	2.50	175.8	173.0	600	3+0—	3+0—	1+2—
Slingerlands, Delmar, etc.	Albany	Albright Spring	10/29/17	0	0	0	0	....	....	....	.014	.016	0	1.20	.40	3.00	137.2	133.0	10	0+3—	0+3—	0+3—
Slingerlands, Delmar, etc.	Albany	Storage reservoir	10/29/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2,000	0+3—	0+3—	0+3—
Slingerlands, Delmar, etc.	Albany	Tap, Delmar	10/29/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	275	1+2—	0+3—	0+3—

SONYEA (Craig Colony for Epileptics)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon examination of plans for control apparatus for chlorine sterilization of the water supply of the Craig Colony for Epileptics, Sonyea, N. Y., submitted to this Department on April 16, 1917, by Hon. Lewis F. Pilcher, State Architect.

Plans for improvements to the water supply system of this institution were approved on August 3, 1916. These plans showed a chlorine control apparatus so arranged and connected as to permit the sterilization of either raw or treated water. The type of apparatus, however, was not indicated on the plans approved. The recently submitted details of this apparatus show a three unit dry feed chlorinator manufactured by the Wallace & Tiernan Co. Assuming this apparatus connected with the suction line of each of the raw water pumps and with that of the filtered water pumps, as shown on the plans approved August 3, 1916, it is evident that the proposed apparatus will be capable of adequately sterilizing the water provided proper operation is maintained. For filtered water, the amount of chlorine applied should not be less than 0.25 part per million by weight, and for raw water, not less than 0.50 part per million.

I would recommend, therefore, that these plans be approved.

Yours very truly,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *April* 24, 1917

SONYEA (Craig Colony for Epileptics)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon the examination of supplementary plans submitted by Hon. L. F. Pilcher, State Architect, on May 29, 1917, showing modifications in the plans for proposed alterations to the water softener plant at Craig Colony for Epileptics at Sonyea, N. Y., approved by this Department on August 3, 1916.

On April 24, 1917, a conference was held between Mr. Booth of the L. M. Booth Company of New York, contractors for the softener plant, and representatives of the State Architect's office, and a representative of this Division. At that time Mr. Booth suggested certain modifications in the arrangement of the water softener plant and at the request of Mr. Nichols of the State Architect's office agreed to prepare plans showing such modifications. The plans now under consideration contain these modifications which consist essentially of the following:

1. The arrangement of the chemical feed pipe so that the softening chemicals may be applied to the raw water at a point near the bottom of the reaction tank at the inlet end of the raw water pipe instead of in the weir box as shown on the plans approved August 3, 1916.
2. The arrangement of the piping in such a way that the reaction tanks will always be used in series and in the same order instead of in either direction or independently as in the layout shown in the plans previously approved.
3. The arrangement of the alum feed pipe so that the alum will be applied to the water at a chute connecting the two reaction tanks instead of at the weir box as previously shown.
4. The placing of the sludge blowouts in the bottom of the chemical mixing tanks instead of in the sides.

The reason for modification No. 1 is that the softening chemicals form incrustations which would clog the raw water inlet pipe thereby reducing its capacity. The reason for the second modification is that it is desired to use an open chute to convey the treated water from the first reaction tank to the second, such a chute being easy to maintain and also obviates the possibility of clogging in the pipe connecting the two tanks as shown in the plans previously approved. The objection to this arrangement is that less flexibility of operation is secured although there is practically no object in having such flexibility save in case of accident to the stirring apparatus and there is so little apparatus in these reaction tanks that repairs could be made very easily and quickly. The reason for modification No. 3 is that when the alum is added at the same point as the lime reaction takes place between the acid alum and the basic lime thus using up the chemicals unnecessarily. The 4th modification simply allows better facilities for cleaning out the chemical mixing tanks.

From our examination of these proposed modifications it would appear that they would not be detrimental to securing the proper treatment of the water and I would therefore recommend that this plan be approved.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 5, 1917

SOUTH GLENS FALLS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of South Glens Falls, made by Mr. C. M. Baker, assistant engineer, July 3, 1917.

South Glens Falls is an incorporated village with a population of 2,350, located in the extreme northeastern part of Saratoga county, on the right bank of the Hudson river, directly opposite the city of Glens Falls. It is also on the Hudson Valley electric railroad. A complete system of public sewers is provided, which discharge into septic tanks, the effluent flowing into the Hudson river.

The public water supply is obtained from a small spring brook, located on low land adjacent to the Hudson river and just south of the village. The waterworks were originally installed in 1889, and then consisted of an impounding reservoir on a stream formed by the confluence of Baker and Wetsel brooks, a gate house with coke strainer, a pumping plant and distribution system. In August, 1898, however, a new impounding reservoir on Baker brook was added and later a second or upper reservoir was constructed on Wetsel brook. The old original reservoir and coke filters are now out of service.

A previous investigation was made of this supply in 1909, and the report thereon published on page 339, volume 2 of the 30th Annual Report. At that time it was pointed out that pollution at times found its way into the supply and the following recommendations were made to the board of trustees, that:

1. A thorough inspection of the watersheds of Baker and Wetsel brook should be made and measures should be taken to remove all sources of pollution and to prevent their recurrence.
2. The streams entering the reservoir from the side are polluted, and it is therefore important that they carry out their intention to divert these streams from the reservoir.
3. In case any difficulties are experienced by them in removing pollution, or if they otherwise find it impracticable to protect their water supply, they should consider the question of application to this Department for the enactment of rules and regulations, in accordance with sections 70 and 71 of the Public Health Law.

Since this previous report recommendation No. 2 has been complied with by the construction of the upper reservoir on Wetsel brook. With this improvement, the use of the coke filters has been discontinued.

Practically all of the population of the village are served with the water, there being some 600 service taps, none of which are metered. The distribution system consists of about 7½ miles of mains, ranging from 4 to 14 inches in diameter. The daily consumption averages 350,000 or 400,000 gallons, with a maximum of possibly 600,000. The pressure is approximately 60 pounds per square inch.

An intake was formerly provided whereby water could be pumped directly from the Hudson river to provide additional supply in case of fire. Although this connection is now abandoned, cross connections are maintained between the village supply and that of the International Paper Mill, by means of which river water may be pumped directly into the distribution system. Gate and check valves are provided between the supplies of the paper mill and the village to prevent the flow of water from the mill system into that of the village under normal conditions.

Ordinarily the reservoir on Baker brook is the main source of supply, but at the time of the inspection this reservoir was being cleaned and the water from the upper reservoir on Wetsel brook was being used. From the impounding reservoirs the water flows by gravity to a masonry reservoir located adjacent to the pumping station, from which it is pumped through the distribution system into a steel standpipe.

The reservoir on Baker brook has a capacity of about 248,000 gallons, and that on Wetsel brook 280,000 gallons. The Baker brook reservoir is constructed with concrete walls and earth bottom, while the Wetsel reservoir is formed by the construction of a concrete dam crossing the natural channel of the brook. The elevation of the water in this reservoir was only 2 or 3 feet above that of the river at the time of the inspection. The standpipe is constructed of steel and has a capacity of about 230,000 gallons. The reservoirs are cleaned yearly and the mains are flushed about three times each year.

The pumping equipment is housed in a brick building and consists of two compound duplex 10-inch by 16-inch by 8½-inch by 10-inch pumps, each having a capacity of 750,000 gallons per day. Steam power is furnished by 2-85 h. p. Franklin return tubular boilers.

The area of the watershed on Baker creek tributary to the supply, is approximately 2½ acres, and on Wetsel brook about 3½ acres. The sources of the streams are springs, the surface watershed of which is an extensive sandy plain lying just east of the reservoir. There is no permanent population on the watershed of Wetsel brook, but there are two or three houses on that tributary to Baker brook. These areas, however, lie very close to the village, and as no property adjacent to the reservoir is owned by the village and no notices are posted regarding trespassing, visitors frequent the area. One person was fishing in the vicinity at the time of the inspection and well beaten paths wind through and over the watershed. Fecal matter was noticed in some cases near the reservoirs. The houses on the watershed tributary to Baker brook are located well back from the streams proper. A state road, however, passes at the top of an embankment, at the foot of which issues a large spring constituting the main source of supply for Baker brook. A catch basin, constructed on the side of the road, near the spring, overflows into a leaching cesspool on the opposite side of the road, this cesspool being about 75 feet only from the spring. The soil is gravelly or sandy and very porous and the road wash, therefore, doubtless finds its way quite directly into the ground water tributary to the spring. Another source of pollution is the overflooding of the Wetsel reservoir and vicinity by the Hudson river at times of high water, this condition having existed only a short time prior to the time of the inspection. Along this point the Hudson drains a populated area and receives direct sewage discharge at points. The danger of serious contamination by such flooding is therefore evident.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
South Glens Falls	Saratoga	Tap, public supply	1/31/12	5	2	....	....	69	....	40	.012	.020	.001	1.02	0.50	2.25	31.2	22.0	140	+	—	—
South Glens Falls	Saratoga	Tap, public supply	3/13/12	Tr.	Cl.	....	....	71	....	61	.020	.024	.001	1.20	0.60	2.50	33.8	21.0	400	+	—	—
South Glens Falls	Saratoga	Tap, public supply	4/19/12	10	Tr.	....	....	58	....	50	.018	.036	.001	0.80	1.30	2.50	32.5	22.0	140	+	+	—
South Glens Falls	Saratoga	Tap, public supply	9/18/12	12	5	....	....	88	....	70	.002	.030	.001	1.00	2.00	2.50	32.5	30.0	5,900	+	+	+
South Glens Falls	Saratoga	Tap, public supply	11/13/12	20	Tr.	....	....	82	....	66	.024	.054	.001	1.00	2.60	2.25	36.4	27.0	400	+	—	—
South Glens Falls	Saratoga	Tap, public supply	12/27/12	Tr.	Cl.	....	....	78	....	66	.016	.008	.001	1.40	1.00	2.75	29.9	23.0	180	+	—	—
South Glens Falls	Saratoga	Tap, public supply	2/20/13	Tr.	Cl.	....	....	53	....	....	.028	.056	Tr.	1.60	1.50	2.00	39.0	20.0	220	—	—	—
South Glens Falls	Saratoga	Tap, public supply	4/25/13	5	Tr.	....	....	74	....	....	.004	.020	.001	0.90	0.60	2.75	36.4	24.0	2,300	—	—	—
South Glens Falls	Saratoga	Tap, public supply	6/3/13	5	Tr.	....	....	79	....	53	.008	.018	.001	1.20	0.80	3.00	33.8	20.0	120	+	+	—
South Glens Falls	Saratoga	Bakers Brook supply	6/3/13	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	550	+	—	—
South Glens Falls	Saratoga	Tap, public supply	6/28/13	Tr.	1	....	....	73	....	....	.010	.026	.002	1.30	0.80	3.00	32.5	22.0	900	+	+	—

South Glens Falls	Saratoga	Tap, public supply	4/9/14	5	1			86		70	.016	.038	.002	1.30	1.50	2.50	39.0	28.0	275	+	+	—
South Glens Falls	Saratoga	Reservoir supply	7/30/15																7,100	+	+	+
South Glens Falls	Saratoga	Reservoir, public supply	7/30/15																1,800	+	+	+
South Glens Falls	Saratoga	Tap, public supply	7/30/15	1	Tr.			45		39	.003	.012	.004	0.08	1.80	1.00	23.4	15.0	14,500	+	+	—
South Glens Falls	Saratoga	Tap, public supply	6/23/17	15	0						.012	.032	0	0.50	1.60	1.50	27.3	21.0	3,600	3+0	3+0	3+0
South Glens Falls	Saratoga	Tap, public supply	6/23/17																300	3+0	3+0	1+2
South Glens Falls	Saratoga	Fountain, high school	6/26/17															Liquef'd		3+0	3+0	3+0
South Glens Falls	Saratoga	Tap, public supply	6/26/17																350	3+0	3+0	0+3
South Glens Falls	Saratoga	Wetsel reservoir	7/3/17																3,500	1+2	0+3	0+3
South Glens Falls	Saratoga	Baker brook	7/3/17																6,700	3+0	3+0	3+0
South Glens Falls	Saratoga	Tap, in village	7/3/17																4,700	3+0	0+3	0+3

The results of these analyses show a water usually satisfactory in physical qualities with respect to color and turbidity, also a water low in hardness. The figures for nitrates and chlorine, however, appear to be above normal, thus indicating that pollution finds its way into the ground water tributary to the supply. The bacterial counts are at times high and colon bacilli have been found present in practically all the 10 c.c. inoculations, frequently in the 1 c.c. and occasionally in the 1/10 c.c. inoculations, thus indicating the presence of active and potentially dangerous contamination.

As a result of this investigation it may be concluded:

1. That the recommendations of the previous report have been only partially carried out.
2. That the public water supply of South Glens Falls is subject to pollution:
   (a) From visitors and trespassers who frequent the vicinity of the reservoirs from which the supply is derived.
   (b) From overflooding of the reservoirs by the Hudson river.
3. That in view of the proximity of the watershed to the village, and since the village owns no land adjacent to the reservoirs nor on the watershed, it is difficult to so control the sanitary conditions as to properly protect the supply.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That in order to protect the sanitary quality of the supply without unnecessary delay, apparatus be provided as soon as possible for sterilization of the supply with liquid chlorine.
2. That if the present supply is to be retained the following measures for improvement be taken:
   (a) The purchase by the village of the watershed tributary to the supply, its enclosure with a suitable fence, and the posting of notices prohibiting all trespassing.
   (b) Application be made to this Department for the enactment of rules and regulations protecting the sanitary quality of the supply.
   (c) The construction of suitable dikes to prevent overflooding of the reservoir by the Hudson river.
   (d) The construction of a watertight drain from the catch basin in the state road just above the spring tributary to Baker brook, to conduct the road wash to some point beyond the watershed, and furthermore that the cesspool and catch basin be made watertight.
3. That if it seems impractical to carry out the above improvements a new supply be developed from some other adequate and satisfactory source.

Finally, I would recommend that copies of this report be sent to the local officials, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 27, 1917

SOUTH NEW BERLIN

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of South New Berlin, made by Mr. C. M. Baker, assistant engineer, on July 25, 1917.

South New Berlin is an unincorporated village of about 500 inhabitants, located on the Unadilla river, that portion on the western bank of the stream being in Chenango county, and that on the eastern bank in Otsego county. The village is located in the town of New Berlin, Chenango county, and in the towns of Morris and Butternut, Otsego county. It is on the New Berlin branch of the New York, Ontario & Western Railroad. About one-half of the village is provided with private sewers, which discharge without purification into the river. A creamery also discharges its sewage into the river without purification.

The water supply is owned and controlled by the South New Berlin Water Company. The regular supply is derived from springs located on the hillside, about ½ mile east of the village. An auxiliary supply is derived from wells located in the village. The supply was first put into operation in 1900. Since this time, however, the auxiliary well supply has been added. Practically all of the population is served with the water, there being in all 94 service taps, only two of which are metered. Due to the lack of meters or other methods of measuring the water used, no definite information could be obtained regarding the consumption. There are in all about 4 miles of water mains, ranging in size from 1 inch to 6 inches in diameter. The pressure ranges from 50 to 60 pounds per square inch.

There are two groups of springs, known as the Owens and Grover springs, respectively. From the Owens springs the water flows into a collecting basin, thence into a main leading from a storage reservoir to the village. The water from the Grover springs, however, flows directly into this reservoir. From the reservoir the water is distributed by gravity through the distribution system. A pump is provided for pumping water from the auxiliary well supply directly into the distribution system. The reservoir is located on the hill just east of the village, is of masonry construction with a wooden roof, and is about 40 x 50 feet in plan. Its capacity is about 170,000 gallons.

The Owens springs are located in woods on the side of the hill about ½ mile northeast of the village. The springs are protected by a masonry box covered with a stone slab over which there is about 1 foot of soil. There appears to be no opportunity for direct surface wash. From these masonry boxes the water flows through an iron pipe for a distance of 150 or 200 feet to a collecting basin. The water from 2 or 3 smaller springs also enters this pipe before it reaches the collecting basin. The water company owns about three acres of land about these springs which is enclosed by a substantially constructed fence.

The Grover springs consist of 9 springs located on the side of the hill in pasture land. They are protected by masonry basins built up about 6 inches above the surface of the ground and provided with covers. A small area 6 or 8 feet square is enclosed about each of the springs by a fence. Although there appears to be no opportunity for direct surface wash, an insufficient area is enclosed about these springs to prevent possibility of pollution by the rapid infiltration of surface wash at times when cattle may frequent the vicinity. The company has the right to use these springs but owns no land about them.

Two wells may at times be used as auxiliary supplies, one owned by the water company and another by Borden's Condensed Milk Company. These wells are located close together, however, and are practically the same in construction. They are 6 inches in diameter by about 255 feet deep. The strata consist of clay for a greater part of the wells' depth, below which is

a water-bearing gravel from which the supply is derived. The general sanitary conditions in the immediate vicinity of the wells appear to be fairly satisfactory. There are, however, about 4 houses within 100 feet, 10 houses 100 to 500 feet distant, and 20 houses 500 to 1,000 feet distant.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show waters from all sources satisfactory in physical qualities with respect to color and turbidity. The water from the springs is low in hardness but that from the well is somewhat hard. The figures for nitrogen in the form of free and albuminoid ammonia and nitrates are low in all samples but those for nitrates and chlorine appear to be at times above normal. The high chlorine from the well supplies, however, is probably due, in part at least, to mineral deposits. The bacterial counts, although usually moderate, are at times high and colon bacilli are frequently found in 10 c.c. inoculations. Regarding the individual sources of supply as indicated by the samples collected at the time of the inspection, the bacterial counts were in all cases high, which, however, is probably due in part at least to the delay in transit, two days elapsing from the time the samples were collected until they were received at the laboratory. Colon bacilli, however, were found present in all of the 10 c.c. and 1 c.c. inoculations of the samples collected from the Grover springs, thus indicating the presence of active and potentially dangerous contamination in this source of supply. This pollution is probably due to the rapid infiltration of surface wash into the springs from the pasture land in which they are located, the possibility of which was pointed out above.

As a result of this investigation it may be concluded:

1. That with the exception of the Grover springs the water supply of South New Berlin is derived from sources which should furnish a satisfactory supply.
2. The supply from the Grover springs, however, is subject to pollution by the rapid infiltration of surface water from pasture land.

In view of the above, I beg to recommend that the water company enclose a sufficient area about each of the Grover springs to adequately protect them from pollution and that suitable drainage ditches be constructed to divert surface wash from the immediate vicinity of the springs.

In conclusion, I would recommend that copies of this report be sent to the water company, to the local officials of the town and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 21, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—				Oxygen consumed	Chlorine	HARDNESS		Bacteria per c.c.; gelatin 20°, 48 hours	B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates			Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
S. New Berlin..	Chenango.....	Tap, public supply.....	1/31/12	1	3	....	....	53	....	38	.032	.044	Tr.	1.44	0.20	1.87	31.2	25.0	1,100	+	—	—
S. New Berlin..	Chenango.....	Tap, public supply.....	3/8/12	Tr.	Cl.	....	....	66	....	47	.010	.030	.001	1.20	0.30	2.00	23.4	17.0	160	+	—	—
S. New Berlin..	Chenango.....	Tap, public supply.....	4/10/12	Tr.	Cl.	....	....	40	....	22	.004	.030	.001	0.50	0.40	1.25	13.2	12.0	160	+	—	—
S. New Berlin..	Chenango.....	Tap, public supply.....	10/12/12	Tr.	Cl.	....	....	55	....	35	.004	.024	.001	1.20	1.20	1.25	23.0	21.0	.....	+	—	—
S. New Berlin..	Chenango.....	Tap, public supply.....	11/5/12	Tr.	Cl.	....	....	42	....	31	.026	.020	.002	0.80	0.40	2.00	20.8	15.0	30	+	—	—
S. New Berlin..	Chenango.....	Tap, public supply.....	2/7/13	Tr.	Cl.	....	....	30	....	....	.010	.020	Tr.	0.96	1.00	2.00	20.8	14.0	20	—	—	—
S. New Berlin..	Chenango.....	Tap, public supply.....	3/19/13	Tr.	Cl.	....	....	45	....	....	.022	.010	Tr.	0.70	0.50	1.50	19.5	13.0	20	—	—	—
S. New Berlin..	Chenango.....	Tap, public supply.....	4/23/13	Tr.	Cl.	....	....	44	....	....	.016	.018	Tr.	0.80	0.20	1.25	16.0	13.0	20	—	—	—
S. New Berlin..	Chenango.....	Tap, public supply.....	6/4/13	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	70	+	—	—
S. New Berlin..	Chenango.....	Tap, public supply.....	7/16/13	Tr.	Cl.	....	....	149	....	....	.044	.002	.00.	0.02	0.70	9.00	85.8	.....	40	—	—	—
S. New Berlin..	Chenango.....	Tap, public supply.....	3/31/14	3	Cl.	....	....	41	....	34	.030	.042	Tr.	0.36	1.10	1.25	18.2	9.0	270	—	—	—
S. New Berlin..	Chenango.....	Public supply, Owens spring	7/25/17	....	....	....	....	....	....	....	....	....	....	....	....	3.00	.....	.....	23,000	0+3—	0+3—	0+3—
S. New Berlin..	Chenango.....	Public supply, Grover spring	7/25/17	....	....	....	....	....	....	....	....	....	....	....	....	2.00	.....	.....	7,000	3+0—	3+0—	3+0—
S. New Berlin..	Chenango.....	Tap, composite spring supply	7/25/17	0	0	1a	0	.....	.....	.....	.004	.014	0	0.70	0.50	2.50	27.3	23.0	21,000	0+3—	0+3—	0+3—
S. New Berlin..	Chenango.....	Aux. supply, water co. well..	7/25/17	0	0	0	0	.....	.....	.....	.004	.004	0	0.02	0.40	34.00	117.2	117.0	39,000	0+3—	0+3—	0+3—
S. New Berlin..	Chenango.....	Aux. supply, Borden well....	7/25/17	....	....	....	....	....	....	....	....	....	....	....	....	11.00	.....	.....	50	1+2—	0+3—	0+3—

SPRINGWATER

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of Springwater made by Mr. C. M. Baker, assistant engineer, on September 7, 1917.

Springwater is an unincorporated village of about 350 inhabitants located in the town of the same name in the southeast corner of Livingston county. It is one mile from the Springwater station on the Rochester branch of the Erie R. R., about 40 miles south of Rochester. Springwater creek, an inlet to Hemlock lake flows through the village. No sewer system is provided, the houses being served by privies, cesspools, etc.

The water supply is obtained from a small impounding reservoir located on a small brook about ½ mile east of the village. From the reservoir the water flows by gravity through the distribution system which consists of about ¾ of a mile of pipe ranging from 2 to 3 inches in diameter. No hydrants are provided for fire protection. About ¼ of the population of the village is served with the water, there being in all some 36 service taps, none of which are metered. The pressure averages approximately 80 pounds per square inch. Due to the lack of meters or other methods of measuring the water used, no definite information could be obtained regarding the consumption. It was stated that the water is not used generally for potable purposes, water for these purposes being obtained from private wells.

The reservoir is formed by the construction of a small masonry dam across the bed of the stream. It is triangular in shape, being approximately 20 feet wide at the dam by 25 feet long, and has a capacity of 6,000 or 7,000 gallons.

The watershed tributary to the supply is about .3 of a square mile in area. The slopes are comparatively steep and the area is used mostly for pasture land. There are two houses on the watershed representing a total population of 10 persons or an equivalent of 33 per square mile.

One house is located near the head of the north branch of the brook. A hogpen and duck pond are located on the stream. A privy which is provided with an earth vault only is located about 100 feet distant and the barn about 20 feet distant from the brook. The general sanitary conditions about these premises were unsatisfactory. The second house is located well back from the stream and there appears to be little opportunity for direct pollution therefrom. The supply is, however, also subject to considerable pollution by surface wash from the pasture land mentioned above.

A sample of the water was collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of these analyses show a water somewhat colored and quite turbid. The figures for nitrogen in its various forms are moderate but those for chlorine are high. The bacterial count is high which, however, may be due in part to delay in transit, since 4 days elapsed from the time the samples were collected, until they were received at the laboratory. Colon bacilli were found present, however, in all three of the 10 c.c. and 1 c.c. inoculations, thus indicating the presence of considerable active and potentially dangerous contamination.

In view of the above it may be concluded that the public water supply of Springwater is derived from a source which is subject to considerable pollution and that consequently the supply is not satisfactory for domestic purposes.

In view of the above, I beg to offer the following recommendations to be acted upon by the water company:

1. That if the present supply is to be continued in use:
   (a) Adequate purification of the supply be provided.
   (b) That pending the installation of a purification plant apparatus be provided and the supply be sterilized with liquid chlorine or by other equivalent method.

2. That, however, if it seems impracticable to purify the present supply, another supply be developed from a source or sources free from pollution.

Finally I would recommend that copies of this report be sent to the water company, the local health officer and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 28, 1917

REPORT OF WATER ANALYSIS FOR SPRINGWATER

		Tap
Source		
Collected on		9/7/17
Color		10
Odor, hot		3 v.
Odor, cold		2 v.
Turbidity		30
Ammonia, free		.014
Ammonia, albuminoid		.102
Nitrites		.003
Nitrates		.30
Oxygen consumed		9.1
Chlorine		2.0
Hardness, total		97.2
Alkalinity		96.0
Bacteria per c.c.		*33,500
B. coli type	10 c.c.	3+0—
	1 c.c.	3+0—
	1/10 c.c.	1+2—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.
* Liquefied.

STAMFORD

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon a reinspection of the public water supply of Stamford, made on July 30, 1917 by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. H. P. Hubbell, health officer, and Mr. J. H. Gilmore, superintendent of the water company.

General information

Location.— Incorporated village in the northeastern part of Delaware county, on the Ulster and Delaware railroad and at the head waters of the west branch of the Delaware river.

Population.— Population ranges from about 1,000 during the winter to about 2,500 during the summer.

Water Supply.— Owned by Stamford Water Co., Mr. J. C. Van Dyke, president and Mr. J. H. Gilmore, superintendent.

Consumption.— Estimated from 95,000 to 250,000 gallons per day.

Source of supply.— Headwaters Delaware river, intake at reservoir about three miles north of the village. Also two drilled wells near filter plant about 1½ miles north of the village.

Filter Plant.— Three pressure mechanical filters 8 feet in diameter and 8 feet high.

Distribution System.— Gravity supply from reservoir and pumping from wells. Six miles of water mains from 4 inches to 8 inches in diameter.

Service Taps.— 232 services only 6 of which are metered.

Pressure.— 92 to 110 pounds in the village.

A previous inspection of this supply was made in 1907 the report of which will be found on page 384, Vol. 2, 1908 Annual Report of the New York State Department of Health.

The water system remains practically as described in previous report except that the drilled wells have been added. Furthermore, no connection now exists whereby the water may be pumped from a lower reservoir formerly in use.

The reservoir now in use is said to have a capacity of from 15,000,000 to 18,000,000 gallons. The watershed above the reservoir has an area of about 1½ square miles upon which are about seven houses representing a resident population of about 30, or about 24 per square mile. No direct pollution from human sources was noticed during the inspection and practically all of the houses are well removed from the river and its tributaries. Much of the watershed is, however, subject to pollution from the pasturing of cattle.

The two drilled wells are 4 inches in diameter, one being 225 feet deep and the other 250 feet. The wells are sunk through about 16 feet of earth and the remaining distance through rock. Four inch casings were driven through the soil to the rock. The pumping plant, located in a frame building 15 by 20 feet adjacent to the filter house, consists of a 13-horsepower Advance gasoline engine, and a Rumsey 6-inch by 8-inch triplex plunger single action belt driven pump.

The filter plant for the surface supply is in a frame structure about 15 by 40 feet in size. The filter medium in the pressure filters consists of about 6 inches of graded gravel under two feet of sand having an effective size of 0.8 mm. and a uniformity coefficient of 1.9. The filters are used only during the summer months of the year, and no alum has been used since the first year in operation of the filter plant. The filters are said to be washed once a day by passing the raw water through them in a reverse direction.

In connection with the use of alum it should be pointed out that sulphate of aluminum when applied to a natural water containing alkalinity or carbonate of lime will react with this alkalinity forming a precipitate of aluminum hydrate. This precipitate occurs in the form of flakes which entangle particles of dirt and bacteria present in the raw water. Without the aid of the coagulant these dirt particles and bacteria would pass through the filters to a considerable extent but when the precipitate is produced entangling the foreign matters the whole is strained out by the filters. As long as alkalinity is present no free alum will pass through the filter.

At the time of the inspection samples of the raw water and of the filtered water were collected and the results of the analyses will be found in the appended table.

From the analyses of these samples it will be seen that the raw water was somewhat colored, had a slight turbidity and was moderately soft. The high figures for albuminoid ammonia, free ammonia and oxygen consumed are apparently due largely to organic matter derived from vegetation and from the cattle pasturing on the watershed. The bacterial counts are moderately high and organisms of the B. coli group were found in 10 c.c. and 1 c.c. inoculations.

The filtered water contained somewhat smaller amounts of color, turbidity, ammonia and oxygen consumed, these results indicating that some degree of purification was being obtained. The bacterial results, however, are far from satisfactory, there being an increase in the total count and organisms of the B. coli group were found in 10 c.c. inoculations.

As a result of this investigation and of the analyses the following conclusions may be drawn:

1. That the public water supply of the village of Stamford is obtained from a source which is subject to considerable pollution derived from cattle pastured upon the watershed and from the houses and roads thereon.

2. That the size of the sand in the filter plant was too large and not in accordance with good practice.

3. That the failure to use alum in connection with the filtration process renders the filters practically useless for effecting bacterial purification.

In view of the above conclusions I would make the following recommendations to be acted upon by the Stamford Water Company:

1. That the filters be placed in a satisfactory condition by providing them with sand having an effective size of from .3 to .5 millimeters.

2. That alum should be applied constantly and in amounts sufficient to secure bacterial removal.

3. That the water company consider the advisability of installing a liquid chlorine apparatus to sterilize all water either before or after filtration.

That the company maintain as far as possible sanitary conditions upon the watershed and in case any difficulty is experienced along this line application should be made to this Department for the enactment of rules and regulations for the protection of the watershed.

I would, therefore, recommend that copies of this report be sent to the Stamford Water Company and to the local authorities.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 27, 1917

REPORT OF WATER ANALYSES FOR STAMFORD

Source		Raw water	Filtered water
Collected on		7/30/17	7/30/17
Color		15	5
Odor, hot		none	none
Odor, cold		1 v.	1 v.
Turbidity		2	tr.
Ammonia, free		.032	.004
Ammonia, albuminoid		.092	.050
Nitrites		tr.	none
Nitrates		.3	.3
Oxygen consumed		2.0	1.7
Chlorine		1.25	1.25
Hardness, total		31.2	39.0
Alkalinity		22	30
Bacteria per c.c.		200	1,500
B. coli type	10 c.c.	2+1—	2+1—
	1 c.c.	1+2—	0+3—
	1/10 c.c.	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m musty; v, vegetable.

STATE DEPARTMENT OF HEALTH (Laboratory Farm)

Additional plans for water supply for the Laboratory Farm of the State Department of Health in the town of Guilderland were approved on July 23, 1917.

TULLY

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report upon an inspection of the public water supply of the village of Tully made by Mr. E. S. Chase on December 22, 1916, in company with and assisted by Dr. W. H. Dwinelle, health officer.

Tully is an incorporated village with a population of 559, located in the southern part of Onondaga county on the Syracuse division of the D., L. & W. railroad, 42 miles south of Syracuse. The village is largely a residential community and trade center for the surrounding agricultural district. There is no sewer system in the village, the houses being served by privies and cesspools.

The public water supply is derived from a shallow dug well located in the northeastern part of the village. The waterworks were constructed in 1896 and no changes or additions have been made to the system since that date. The system is owned and operated by the village under the direction of the Water and Light Board of which Mr. H. D. Bailey is president and superintendent.

Nearly the entire population is served by the supply and the daily water consumption may be estimated at 48,000 gallons or 85 gallons per capita. The water mains consist of about 3 miles of pipe ranging in size from 4 to 10 inches in diameter and from the distribution system there are about 175 services of which ⅓ are metered. The water is pumped from the well through the distribution system against a pressure of about 75 pounds per square inch maintained by an open reservoir on the hill west of the village.

The well was developed by sinking a steel caisson 12 feet in diameter to a depth of 16 feet. The well passes through gravel for its entire depth. A concrete curb constructed around the top prevents the admission of surface water and the whole is covered by a wooden shed. The water stands in the well to a depth of about 6 feet and even under excessive pumping is not lowered more than 3 feet.

The pumping equipment is located in a wooden building, immediately adjacent to the well, which contains the municipal lighting plant of the village. The pumping equipment consists of a Worthington cross compound duplex double acting plunger pump operated normally at the rate of 50 revolutions per minute. A Dean duplex plunger pump of the same dimensions is kept in reserve for emergency use. The steam for the operation of the pump is derived from two 100 horse power boilers which are also used in connection with operating the lighting equipment.

The reservoir was constructed by excavating into the side of the hill and lining the inside slopes of the excavation with masonry. The top of the reservoir is approximately 85 by 100 feet and the bottom 50 by 70 feet while the depth is about 15 feet. The total capacity, therefore, may be estimated at approximately 700,000 gallons. The reservoir is open but is protected from surface wash and surrounded by a wire fence.

The location of the well practically within the village is not particularly satisfactory. It is stated, however, that the direction of the ground water flow is from the well toward the village, but in view of the apparently porous nature of the water-bearing stratum it seems very probable that at times of heavy pumping the flow of ground water may be from the thickly settled portion of the village toward the well. There are approximately 10 houses beyond 100 feet and within 500 feet of the well and 22 houses beyond 500 feet and within 1,000 feet radius of the well. The nearest privy is about 100 feet distant. The land east of the well is devoted to agriculture. The land within the immediate vicinity of the well is comparatively level, the village being located in the valley between moderately high hills.

There has been some trouble due to tastes and odors derived from algae developed in the reservoir. This has been obviated by cleaning the reservoir. At one time a man, found bathing in the reservoir, was arrested and fined.

Subsequent to the time of the inspection samples of the water were collected by Dr. Dwinelle, the results of the analyses of these samples together with others made in the past by the Division of Laboratories and Research will be found in the appended table.

These analyses show a clear but colorless and very hard water. The figures for nitrogen in its various forms and especially those for nitrates are higher than should be found in an unpolluted ground water. The figures for chlorine are also very high and these figures taken in conjunction with the high figures for nitrates indicate the occurrence of considerable organic pollution of the ground water tributary to the supply, usually rendered inactive by the natural processes of purification. The bacterial counts are in some cases extremely high although this may be due to delay in transit. Organisms of the B. coli type are usually absent although they have been found occasionally in small dilutions indicating that at times the natural processes of purification are incomplete.

In view of the above the following conclusions may be drawn:

1. That the well from which the public water supply of Tully is derived is unsatisfactorily located with respect to its proximity to the various dwellings in the village.
2. That the analytical results indicate the occurrence of considerable pollution of the ground water tributary to the supply, usually rendered inactive by natural processes of purification although at times the occurrence of organisms of the B. coli type indicates active contamination.

In view of these conclusions, I beg to recommend:

1. That the village authorities consider the development of a new well, possibly at a point several hundred feet east of the present well in order to secure a supply remote from potential sources of contamination.
2. That when the above recommendation is carried out an area at least 200 feet in diameter around the new well be enclosed by a suitably constructed fence and trespassing in the enclosure be strictly forbidden.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *February* 28, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Tully	Onondaga	Tap, public supply	6/5/08	Tr.	Tr.			352			.002	.008	Tr.	4.00	0.55	11.00	253.0	204.0	8	−	−	−
Tully	Onondaga	Tap, public supply	12/7/08	Tr.	Cl.			277			.052	.058	Tr.	0.20	0.70	4.50	214.0		200	−	++	−
Tully	Onondaga	Tap, public supply	9/8/10	Tr.	Cl.			258		218	.008	.118	.002	0.96	0.20	5.25	183.0	178.0	1,700		+	+
Tully	Onondaga	Tap, public supply	10/15/10	Tr.	Cl.			281		192	.012	.032	.003	0.60	1.00	6.50	180.0	178.0				
Tuly	Onondaga	Tap, public supply	6/12/11																20	−	−	−
Tully	Onondaga	Tap, public supply	9/12/11	Tr.	Cl.			260		225	.002	.020	.001	0.30	0.60	5.00	201.0	190.0	2,200	+	−	−
Tully	Onondaga	Tap, public supply	4/4/12	Tr.	Cl.			366		310	.004	.016	Tr.	3.60	0.10	11.50	257.0	230.0	20	−	−	−
Tully	Onondaga	Tap, public supply	7/21/16	Tr.	Cl.	1v	1v				.002	.018	.003	7.60	0.70	15.25	343.0	213.0	42,000	−	−	−
Tully	Onondaga	Tap, public supply	1/7/17	Tr.	Tr.	2v	2v				.004	.032	.001	2.40	0.60	10.25	257.0	240.0				
Tully	Onondaga	Tap, public supply	1/8/17																45	3+0−	1+2−	0+3−

UTICA

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report on an investigation of an outbreak of typhoid fever in the city of Utica, made by Mr. E. S. Chase, assistant engineer, acting in cooperation with Dr. J. E. Clark, sanitary supervisor, and Dr. C. N. Hichman, health officer.

On February 2, 1917, information was received by this Department that several cases of typhoid fever were present in Utica and, as there seemed to be some question as to whether the public water supply might be responsible for the outbreak, an investigation was immediately started by the engineering division to determine the source of the infection.

This investigation included the collection of all facts that might have a bearing upon the cause of the outbreak, and a canvass of all the cases of typhoid was made in order to find out the food or drink supply used in common, and to determine as accurately as possible the date of the onset of the disease. Data were also collected with respect to the supplies of milk, uncooked foods and ice, occupation, association with previous cases of typhoid and all other factors which might possibly have a bearing upon the cause of the infection.

The investigation disclosed the fact that some 49 cases of typhoid had occurred in the city of Utica with onsets since the first of January of the present year. The data obtained with respect to these cases are given in detail in the appended table "A".

This table has been summarized first to show the prevalence and intensity of the outbreak as indicated by the probable dates of onset as follows:

Probable dates of onset

Jan. 10, 2 cases; Jan. 11, 1 case; Jan. 12, 1 case; Jan. 13, 1 case; Jan. 14, 4 cases; Jan. 15, 1 case; Jan. 16, 1 case; Jan. 17, 1 case; Jan. 18, 2 cases; Jan. 19, 1 case; Jan. 20, 4 cases; Jan. 21, 4 cases; Jan. 22, 1 case; Jan. 23, 4 cases; Jan. 24, 3 cases; Jan. 25, 1 case; Jan. 26, 8 cases; Jan. 27, 5 cases; Jan. 28, 2 cases; Jan. 30, 1 case; Feb. 4, 1 case.

From this table it will be seen that the peak of the outbreak occurred during the week of January 21, and, allowing two weeks for the average period of incubation of the typhoid germ in the human system, it is evident that the specific period of infection occurred about the first week in January.

With reference to the milk supply, the table of case data has been summarized to show the milk supplies used by the various cases as follows:

Cases of typhoid on each milk dealers' route

Milkman	*Cases*
Schwertfeger	13
Trembly	9
Eaglie	4
Condensed milk or none	8
Ten other dealers	14
Unknown	1

This table shows that there is no particular predominance of cases upon any milkman's route and those dealers which have the most cases are those which have large numbers of customers in that section of the city in which the cases have occurred. Inquiries into the possibility of typhoid cases at the dairies from which the milk is derived led to no information as to such occurrence.

A careful study of the data indicates that all probability of infection from such other sources as ice, raw oysters, uncooked food, raw vegetables, contact, etc., may be eliminated in the majority of cases. Twenty-one or less

than 50 per cent of the cases gave evidence as to having eaten celery or lettuce around the holidays, at a time when the consumption of such food might be expected to be more or less common throughout the city. In only two cases was there evidence of raw oysters having been eaten. Three cases may have been due to contact, having occurred in houses in which primary cases have been present, two or more weeks previous. One case may have been due to a carrier, as a sister of this case had typhoid the previous summer. With respect to sex, the cases are about equally divided, there being 27 females and 22 males. The occupations are diverse and in very few cases is there evidence of common association, such as church, social gatherings or places of work.

The study of the data narrows the field of investigation down to two factors affecting in common the majority of cases. First the localization of residence, the cases, with three exceptions, occurring in the 9th, 11th and 14th wards of the city. These wards, containing approximately 20 per cent of the population of the city, contained 90 per cent of the cases. This localization of the outbreak is also shown by the appended map. The second factor in common is the public water supply.

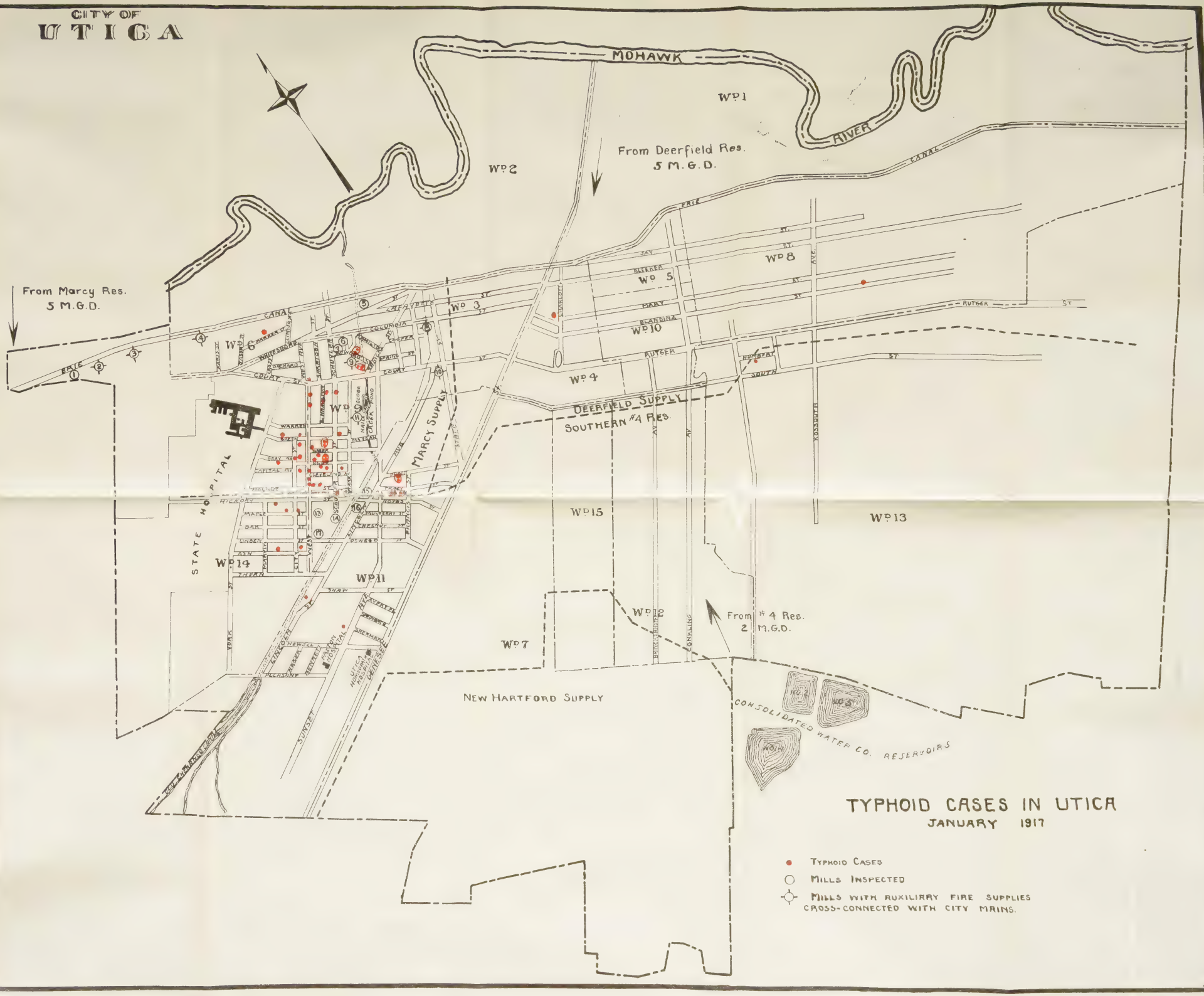
Excluding the four cases due possibly to contact, it will be seen that 41 cases used the city water unboiled, although in a few instances the water has been boiled since the middle of January but subsequent to the probable period of infection. Of the four cases using boiled water, in the case of two only is there evidence that the water was boiled more or less consistently. By the process of elimination, therefore, the evidence points strongly to the public water supply as the probable source of infection. In this connection it is significant that the outbreak was not of a markedly explosive nature and that there seems to be no preponderance of cases among the younger children. Both these characteristics are indicative of waterborne typhoid as is also the age distribution. The age distribution at Utica and during two epidemics elsewhere, one due to water and the other to milk is shown by the following table:

Table showing percentage of typhoid cases at specified ages

AGE IN YEARS	Utica, N. Y.	Epidemic caused by water, Whitehall, N. Y.	Epidemic caused by milk, Stamford, Conn.
0 to 10	18	21	35
10 to 20	32	42	24
20 to 30	18	13	23
30 to 40	16	13	12
40 to 50	6	11	5
50 to 70	10	.....	1
Total	100	100	100

The figures for Stamford are from "Typhoid Fever" by George C. Whipple.

The public water supply of Utica is owned and operated by the Consolidated Water Company, and is derived from two principal sources, namely, West Canada creek impounded in the Hinckley reservoir, 20 miles northeast of the city and from a series of reservoirs located just southeast of the city limits. The water from the northern watershed is soft while that from the southern is very hard. The water from the Hinckley reservoir flows first to two reservoirs located 3 or 4 miles north and northwest respectively of the city. One of these reservoirs, known as the Deerfield reservoir, is located three miles north of the city and the main from it enters the city at the foot of Genesee street. This reservoir also receives a small amount of water from Reels creek, a small tributary to the Mohawk. The other distributing reservoir


CITY OF
UTICA
MOHAWK
RIVER
CANAL
From Deerfield Res.
5 M.G.D.
From Marcy Res.
5 M.G.D.
Wp 1
Wp 2
Wp 3
Wp 4
Wp 5
Wp 6
Wp 7
Wp 8
Wp 9
Wp 10
Wp 11
Wp 12
Wp 13
Wp 14
Wp 15
DEERFIELD SUPPLY
SOUTHERN #4 RES.
MARCY SUPPLY
NEW HARTFORD SUPPLY
From #4 Res.
2 M.G.D.
CONSOLIDATED WATER CO. RESERVOIRS
STATE HOSPITAL
TYPHOID CASES IN UTICA
JANUARY 1917
Typhoid Cases
Mills Inspected
Mills with auxiliary fire supplies cross-connected with city mains.

known as the Marcy reservoir is located about 4½ miles northwest of the city and the main from this reservoir enters the city near the western city line. The distributing reservoir No. 4 on the southern watershed discharges into the city mains at the head of Mohawk street, and also into separate mains supplying the village of New Hartford and a small portion of the city itself.

The mains of the distribution system of Utica are all interconnected and it is therefore possible for the water from any of the three distributing reservoirs to reach any portion of the city. It is probable, however, that the water from the Deerfield reservoir reaches that section of the city east of Genesee street and north of South street and possibly to some extent a small section west of Genesee street. The water from the Marcy reservoir reaches the villages of Whitesboro and Oriskany with a combined population of upwards of 5,000 and that section of Utica west of Genesee street and north of Hickory street. The water from the southern reservoirs under ordinary conditions probably reaches that section of the city south of South street and east of Genesee street. These boundaries are of course approximate and are given to illustrate in a general way only the distribution of the waters from the various sources throughout the city. The heavy draft upon the supply is in the northern part of the city, which receives mainly the waters from the Marcy and Deerfield reservoirs. Approximately 5,000,000 gallons a day are delivered by each of these reservoirs and 2,000,000 gallons from the southern reservoirs. At night, when the draft upon the system is less than during the day, the water flows through the distribution system from the northern portion of the city toward the southern section, and at this time a back flow may occur into the southern distribution reservoir, due to the fact that the Deerfield and Marcy reservoirs are at a somewhat higher elevation. An automatic hydraulicly-operated gate valve has been installed to stop any excessive back flow which may occur. At times of heavy draft in the northern section of the city the water from the southern water system may reach points in the distribution system nearer north and west than has been indicated in the preceding discussion. At times hard water has been noticed as far north as Court street and as far west as Stark street. Owing to the fact, however, that certain mills require soft water in their process, it is the aim of the water company to maintain soft water in the northern part of the city.

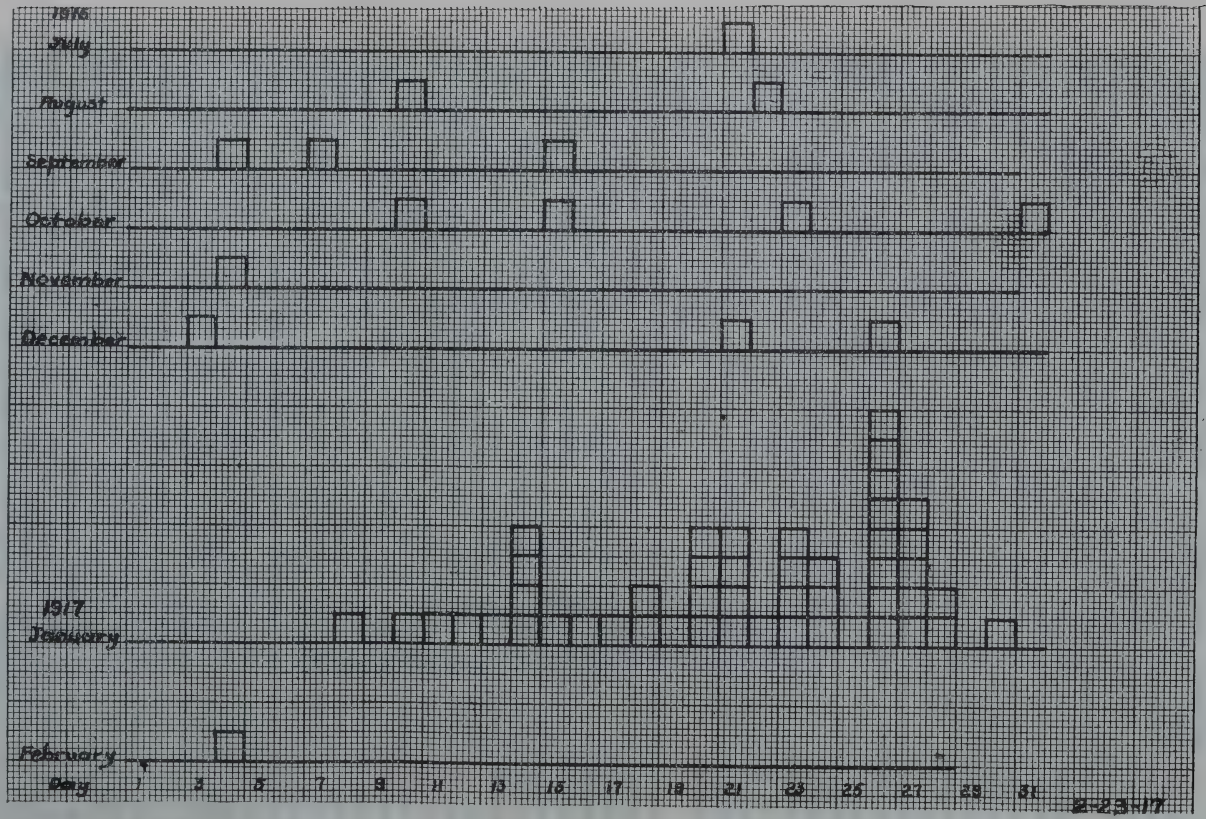
That portion of the city in which the majority of cases of typhoid have occurred is situated in the zone where the pressures from the north and from the south are maintained in a somewhat unstable equilibrium. In other words, it is possible that this particular section of the city may receive water from either the north or from the south, although probably during the greater part of the time from the north, this being due to the necessity of supplying soft water at all times to one of the mills near the northern part of this zone. It is evident that, due to the peculiar conditions of flow and balancing of pressures, the water in the mains in this section is more or less in a state of oscillation, the general flow, however, being in a southerly or southwesterly direction, due to the fact that in the extreme southwestern part of the zone the distribution system terminates at a dead end and also due to the fact that there are several large consumers of water in the southern part of the zone. Furthermore, at times the State Hospital draws heavily upon the system in the western part of this zone.

From the above discussion it will seen that the area in which the cases of typhoid have occurred probably receives during the greater part of the time water from the Marcy distributing reservoir. This reservoir, however, as above stated, supplies the villages of Oriskany and Whitesboro and the residential portion situated in the northwestern part of Utica itself and in which no cases of typhoid have been reported. Furthermore, the waters from all three distribution reservoirs are sterilized with liquid chlorine, the amount of chlorine ranging from approximately .3 to .4 parts per million. During November and until December 11, however, the southern supply was not treated. No cases of typhoid have occurred, however, in that section of the city which receives southern water exclusively nor in New Hartford. A care-

ful scrutiny of the records of the water company with respect to the operation of the apparatus for the application of the chlorine to the supplies did not disclose any interruption in the chlorine process since December 11, 1916. Frequent analyses made by Professor G. C. Hodges of the water company indicate that the waters as delivered to the city have been of a reasonably satisfactory sanitary quality. With all other possible sources of infection excluded, these facts indicate that the water supply from the Marcy reservoir received infection within the mains at some point within the city limits and in all probability in or near that district in which the cases have occurred.

As soon as this localization of the infection was indicated a careful study was made to determine the possible point or points at which infection could reach the water in the city mains. From the records of the water company it appeared that no mains had been opened in this section of the city since the spring or summer of 1916. One hydrant, however, had been thawed out in the middle of January and a dead end had been extended in the southwestern part of the district in the middle of December. The location, dates and methods employed in this work were such as to preclude probable infection at these times. The next point into which inquiry was made was that of the presence of auxiliary mill supplies from polluted sources for fire protection or other purposes and cross-connection with the city mains. Inquiries in this matter disclosed the fact that the Globe Woolen Mill located at the corner of Stark and Court streets in the northeastern section of the infected zone was supplied with such an auxiliary system and that during the past summer and fall extensive alterations had been made in the system. A further inquiry into the nature, character and extent of these alterations disclosed the following facts:

For several years this mill has not been in operation, but has been recently acquired by the American Woolen Company. Upon resumption of operation of this mill the insurance association required radical changes in the hydrant and sprinkler system of the mill. The survey of this mill by the insurance inspectors showed a complicated system of water pipes, hydrants, sprinklers, service pipes for general mill purposes and the city mains interconnected. For auxiliary fire service a 1,000-gallon-per-minute plunger pump was provided, obtaining its supply from a pond on the grounds of the mill, this pond being fed by Nail creek, a stream flowing from the old Chenango canal through a thickly settled portion of the city. With the old system of piping it was possible that with the fire pump in operation water from this creek might be pumped back into the city mains, as at that time there were no check valves provided between the two systems to prevent such an occurrence. About the 1st of September, 1916, work was started under the direction of the insurance association to separate the service lines of the mill from the sprinkler and hydrant system. This work continued until the second week in November. All mains supplying water for general mill purposes were disconnected from the hydrant and sprinkler system, although two connections were retained between the fire system and the city mains, one connection being from the 12-inch main in Stark street and the other from a 6-inch main in Court street. These connections, however, were provided with two gate valves between which were placed single check valves designed to shut off the city supply at such times as a greater pressure might be produced by the fire pump in the mill. Upon the completion of the work a test was made to determine the tightness of the hydrant and sprinkler lines as well as to indicate the positive action of the check valves. At the time of this test, November 16, 1916, a pressure of about 135 pounds was maintained for about 1 hour with the pump operating at a rate of about 3 revolutions per minute. This slow rate of operation indicated to the insurance inspector that the system was tight and that the check valves were operating. The pressure in the city mains is about 90 pounds per square inch, so that there was a pressure of about 45 pounds, tending to keep the check valves closed. Since this test on November 16 there is no evidence that this fire pump was again in operation until January 31, 1917. It should be noted, however, in this connection that



INCIDENCE OF TYPHOID FEVER AT UTICA. CASES PLOTTED ACCORDING TO DATES OF ONSET.

during November, particularly during the latter part of the month, a great many cases of diarrhea occurred suddenly and intensively in that section of the city in which the typhoid fever cases later occurred. In view of the fact that the hydrant lines in this mill had been recently opened and in some cases relaid in trenches containing dirty water and in such manner as to give opportunity for contamination in some of the pipes, and in view of the seriously contaminated condition of Nail creek, it seems quite possible that local contamination of the water supply was received at this point in November. It is well known that check valves are extremely unreliable in operation, especially when the pressure tending to close them is comparatively small and also on account of the ease with which the valve is kept from closing by particles of gravel or bits of wood catching between it and the seat. In this particular installation the cross-connection of the two mains of the city by means of the fire system in the mill renders probable the more or less constant opening and shutting of the check valves due to varying and indeterminate changes in pressure in the city mains on the two street connections, such change in pressure tending to set up a flow of water of short duration through the hydrant system of the mill. It is very easy to see that in this manner greater or less amounts of polluted water from the hydrant system might be admitted to the city mains.

There are numerous cases on record where the failure of check valves designed to separate polluted auxiliary supplies from the city supply have failed to operate properly with resultant outbreaks of typhoid fever. Amongst the better known of such cases are those at Lowell, Mass., Philadelphia, Pa., and Auburn, N. Y. In Utica itself several years ago a small outbreak of typhoid occurred among the employees of the International Heater Company due to the fact that a valve separating a polluted supply from the city supply was either open by accident or was leaking. Another case of the unreliability of check valves also occurred in Utica. During the summer of 1916 a representative of the Underwriters' Association found that the check valves in one of the mills of the eastern part of the city were fastened open.

Subsequent to the collection of this information regarding the Globe Woolen Mills it was deemed advisable to make an investigation of other mills in the western part of Utica in order to determine the extent to which auxiliary fire systems were in use in this portion of the city, this investigation being made by Mr. C. M. Baker, assistant engineer of this Department. For convenience the facts of this investigation are summarized in appended table B.

The facts given in this table show that such auxiliary supplies and cross-connection occur to considerable extent and it should be pointed out that in every case where auxiliary fire supplies from polluted sources are separated from the city mains by check valves only there is every possibility of contamination of the water in the city mains and possibly infection.

Various samples of the city water were collected at the time of the investigation as well as samples of water from Nail creek, the Erie canal and of ice from the Erie canal. The results of the analyses of these samples made by the Division of Laboratories and Research are shown in the appended table. Subsequent to the outbreak of diarrhea in November several samples of water were collected in the western section of the city and the results of the analyses of these samples are also given in the appended table. On December 1 several samples were also collected in this district by Professor Hodges and the results of his analyses indicate considerable contamination of the water. The analyses of samples collected on December 8 also indicate active and possibly local contamination of the supply, and the analyses of samples taken at the time of the recent investigation indicate also a small amount of active contamination of the water in this district.

To summarize, it may be stated that the investigation has eliminated contact (with four exceptions), carriers, raw foods and milk as agents in the causation of the outbreak, leaving therefore only the locality of residence and the public water supply as common factors in the majority of the cases. The fact that those sections of the city receiving water from the Deerfield

and Southern reservoirs, as well as certain sections receiving Marcy water, have been practically free from cases of typhoid, indicates a local infection of the water in the mains, analytical results having shown that active contamination has actually occurred. Several mills in or bordering the infected district have auxiliary water supplies from polluted sources separated from the city mains by check valves. In view of the unreliable character of such check valves it seems clear that these auxiliary supplies are the most probable source of the infection of the water in the mains. It is impossible, however, with our present knowledge to state definitely the particular mill or the particular time from or at which the infection was introduced into the mains, owing not only to the lack of information on the part of the mill owners but also to the fact that information of this kind is very difficult to obtain on account of the tendency on the part of those in authority not to assume responsibility. The entire epidemiological evidence, however, points strongly to localized infection of the city water, and the facts relating to the existence and operation of check valves between auxiliary mill supplies from polluted sources leave no doubt as to these cross-connections being the indirect means through which the infection occurred.

I would therefore recommend:

1. That the city and water company's authorities make a careful and thorough inspection of all mills and other establishments in the city to determine the presence of all cross-connections between private supplies from sources other than those of the public supply.
2. That steps be taken, as this investigation progresses, to correct all conditions which may tend to allow the introduction of polluted water into the city mains through such connections.
3. That, in order to determine the presence of contamination from these or other sources, the water company make a survey by means of laboratory analyses of samples taken from various points in the distribution system.
4. That the proper city authorities pass an ordinance requiring the complete physical severance of all auxiliary supplies from the general city supply, except in those cases where the sources of such auxiliary supplies have been found to be safe against the possibility of contamination.

It is believed that the rearrangements of sprinkler and hydrant systems necessary to carry out this fourth important recommendation can be made without excessive cost, without increasing the fire risk and without impairing the efficiency of either the auxiliary or the city services.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March 1*, 1917

TABLE A

TYPHOID CASE DATA, UTICA, N. Y. 1917

No.	NAME AND ADDRESS	Age	Occupation	Onset date	Water	Milkman	Uncooked foods	History of diarrhea in fall	History of typhoid among associates	Remarks
1	Jennie Nelson, 1014 Blandine St.	15	?	Jan. 8	City, unboiled	?	None	?	None.	
2	Albert Redner, 1005 Green St.	45	Cabinet worker	Jan. 10	City, unboiled	Trembly	Celery at Xmas. Few raw oysters	Had diarrhea in Nov. and Dec.	None	Risley Spring water since sick.
3	Henry Bick 1017 Wager St.	41	West End brewery	Jan. 11	City, unboiled	No milk	Celery and lettuce	Yes	None.	
4	Mary Maier 1229 Hickory St.	17	Schuyler mills	Jan. 12	City, unboiled	Trembly	Small amount of green vegetables	None	None	Vogel's bakery.
5	Robert Kellog 806 Edward St.	35	Alliance knitting mills, Whitesboro.	Jan. 13	City, unboiled	Seibert grocery	?	Yes	None.	
6	Viola Horn, 927 West Ave.	7	St. Joseph's school	Jan. 14	City, unboiled	Schiedleman	Celery at Xmas	Family had diarrhea in Nov.	None.	
7	Wm. Breslin, 1218 Schuyler St.	43	Globe woolen mills	Jan. 14	City, unboiled	Schwertfeger	No	No	None.	
8	Mildred Bourne, 703 Humbert St.	20	N. Y. Telephone Co.	Jan. 14	City, unboiled	Trembly	Celery	Yes	None	Visited friends at 813 Wager St. frequently before sick.
9	Edward Pierce, 1020 Walnut St.	26	Fireman, D. L. & W. railroad.	Jan. 14	City, unboiled	Schwertfeger	Celery at Xmas	None	None	City water boiled since sick and Risley spring water.
10	Marjorie McCarthy, 618 Charlotte St.	13	South Street school	Jan. 15	City, unboiled	None	None	None	Sister had typhoid last summer.	
11	Dorothy Lester, 1214 Stark St.	9	Hamilton school	Jan. 16	Boiled after Jan. 16.	Schwertfeger	Celery at Xmas	Family had diarrhea Nov. 13.	Mother had typhoid when a child.	
12	Mildred Seelye, 707 Plant St.	17	Kemble academy	Jan. 17	City, unboiled	Kiniry-Borden	Lettuce and celery about Xmas.	None	None	Water boiled since Xmas at home.
13	Reginald Burke, 816 Varick St.	14	Union Street school	Jan. 18	City, boiled intermittently	Parry	Oysters and celery	Family had diarrhea.	None.	
14	Mrs. Farley, 1013 Knox St.	56	Housewife	Jan. 18	City, unboiled	Schwertfeger	Celery at Xmas	None	Son had typhoid two years ago.	City water boiled since about middle of Jan.
15	J. C. Stittig, 1103 Maple St.	28	Utica Knit Co., Clayville.	Jan. 19	City, unboiled	Trembly	Celery	Yes	None.	
16	Mary Thomas, 1214 Maple St.	22	Bird, Jones & Kenyon.	Jan. 20	City, unboiled	Borden's Cond.	Small amount of lettuce.	Had diarrhea in fall.	None.	
17	Charles Sanger, 1209 Gray St.	21	Optician	Jan. 20	City, unboiled	Schwertfeger	Celery at Xmas	Had diarrhea in fall.	None.	
18	Beatrice McGauley, 1120 West Ave.	14	Academy school	Jan. 20	City, unboiled	Schwertfeger	None	None	None.	

TYPHOID CASE, DATA, UTICA, N. Y., 1917 — *Concluded*

No	NAME AND ADDRESS	Age	Occupation	Onset date	Water	Milkman	Uncooked foods	History of diarrhea in fall	History of typhoid among associates	Remarks
19	William Walter, 1309 Schuyler St.	40	Bossert Co.	Jan. 20	City, unboiled.	None	Celery	None	None.	
20	Charles Newton, 1119 City St.	30	Heren Mfg. Co.	Jan. 21	City, unboiled.	Trembly	None	Had diarrhea in fall.	None.	
21	Edmund Wertz, 1100 Green St.	17	Academy & Mott Whl. Wrks, after School.	Jan. 21	City, unboiled.	Condensed milk	None	Had diarrhea in fall.	None.	
22	Hilda Grossbrandt, 1115 West Ave.	15	Housework	Jan. 21	City, unboiled.	Schwertfeger	Green vegetables.	None	None	Home baked bread.
23	Ethel Pierce, 1316 Francis St.	12	Francis Street school.	Jan. 21	City, unboliled.	Trembly	Celery	Yes	Yes	Visited mother at 1202 Stark, where there was bowel trouble.
24	Alice Ames, 1658 Sunset Ave.	11	School	Jan. 22	City, unboiled.	Humphreys	Probably celery at Xmas.	Family had diarrhea in Nov. and Dec.	None.	
25	Christina Greiner, 1215 West Ave.	31	Fraser-Dept. store.	Jan. 23	City, unboiled.	Stahl	None	None	None.	
26	Myron Albright, 1208 Green St.	10	School No. 19.	Jan. 23	City, unboiled.	Schwertfeger	None	None	None.	
27	Josephine Ryan, 1016 Knox St.	60	Housewife	Jan. 23	City, unboiled.	Condensed milk	None	Brother had diarrhea in fall.	None.	
28	Mildred Williams, 908 Schuyler	16 mos.	Infant	Jan. 23	City, unboiled.	None	None	None	None	Water boiled after scare.
29	Rose Keiser, 1202 West Ave.	36	Housewife	Jan. 24	City, unboiled.	Parry	Lettuce at Xmas.	Husband had diarrhea in Dec.	None	City water boiled and mineral water more or less constantly since outbreak of diarrhea.
30	Ethel Marclay, 712 Tracy St.	34	No. 2 Schuyler St. Mill.	Jan. 24	City boiled from Nov. 18 to Jan. 24.	Schwertfeger	Celery		None.	
31	Louisa Wirt, 1502 West Ave.	18	Utica cutlery works	Jan. 24	City, unboiled.	Borden B., pasteurized.	None	Had diarrhea Nov. 6.	None	In New York at Xmas.
32	Bertha Thieme, 1642 Lincoln Ave.	23	Robert's Dept. store.	Jan. 25	City, unboiled.	Eaglie	None	None	None	Called on Grandmother near Knox St. and West Ave.
33	Earl Martin, 806 Edward St.	9	School	June 26	City, unboiled.	Knauer	None	Yes	None	Same toilet as No. 20.
34	Antoinette Frick, 1214 Parker St.	32	Fort Schuyler Knitting	Jan. 26	City, unboiled.	(3) Vors, Wester, Keyes.	None	None	None	She does not drink milk.
35	John Hadysnki, 1010 Knox St.	10	School 19	Jan. 26	City, unboiled.	Schwertfeger	None	Yes	None.	

36	L. J. Cole, 1024 Court St.	32	Utica Steam Engine and Boiler Works.	Jan.	26	City, unboiled....	Norman.....	None.....	None.....	None.....	Spring water at works.
37	Anna Penner, 1108 West Ave.	23	Housewife.....	Jan.	26	City, unboiled...	Schwertfeger...	None.....	Had diarrhea before Xmas.	None.	
38	Stanley Gabronkiewicz, 907 Schuyler St.	16	Utica Cutlery Co.....	Jan.	26	City, unboiled....	Levinsky.....	None.....	None.....	None.....	Home baked bread.
39	Frank Schreader, 906 Green.	65	Travelling shears sharpener.	Jan.	26	City, unboiled....	Masse, Stark St.	None.....	Had diarrhea in fall.	None.	
40	Ray Redner, 1005 Green.	23	Bossert Mfg. Co.....	Jan.	26	City, unboiled....	Trembly.....	Celery.....	Yes.....	See No. 2.	
41	W. C. Vogel, 1221 West Ave.	35	Baker.....	Jan.	27	City, unboiled....	Schwertfeger...	Celery at Xmas...	Family had diarrhea in Nov.	None.	
42	Josephine Hadynski, 1010 Knox St.	20	Globe Woolen Mills...	Jan.	27	City, unboiled....	Schwertfeger...	None.....	Yes.....	None.....	Drank considerable water boiled since Jan. 26.
43	Gertrude Well, 1006 Walnut St.	5	Francis Street kindergarten.	Jan.	27	City, unboiled....	Trembly.....	None.....	Had diarrhea just after Thanksgiving.	Father had typhoid 18 years ago	Great water drinker.
44	Joseph Burns, 1233 West Ave.	25	Bossert Co., 1019 Hickory St.	Jan.	27	City boiled intermittently.	Eaglie.....	None.....	None.....	None.....	Boards at 825 Waverly Pl. at Ossining, Jan. 10.
45	Harry Leonard, 1224 Ash St.	51	Savage Arms.....	Jan.	27	City, unboiled...	Stahl & Eaglie.	Celery at Xmas...	Had diarrhea in Nov.	Daughter had typhoid 8 years ago.	
46	Cecilia Kreber, 816 Varick.	9	St. Joseph's school....	Jan.	28	City, unboiled....	Eaglie..... ...	None.....	None	Typhoid across hall, see No. 13.	Use same toilet.
47	Elsie Seelye, 707 Plant St.	13	School.....	Jan.	28	See No. 12.					
48	Joseph Touraint, 907 West Ave.	8	St. Joseph's school....	Jan.	30	City, unboiled....	Trembly & Jones.	None.....	Family had diarrhea in fall.	None.	
49	Theresa Ritz, 925 S. Hamilton.	65	Housewife.....	Feb.	4	City, unboiled...	None.....	None.....	Yes.....	None	Has had bowel trouble for 3 years. No widal.

TABLE B

No.	MILL AND LOCATION	Auxiliary supply, source and system	Cross connections to city mains	Tests, etc.	Over-hauling
1	*Utica Spinning Co., Whitesboro....	None.			
2	Foster Box Board Co., Erie street...	Erie Canal, pumped, low pressure, No. 25.	One connection; gate valve and single check.	Inspected by underwriters.....	None.
3	Utica Knitting Co., Mill No. 1 and 4, Erie street.	Erie Canal, pumped for fire protection and dye house.	Two connections; two double checks in pits.	Underwriters and use of pump for dye house.	None.
4	Mutual Box Board Co., Erie street...	Erie Canal, pumps for fire protection and paper machine, also connected with No. 3.	One connection; one double-check, in pit.	Underwriters and frequently by mill.	None.
5	Utica Steam Engine and Boiler Works, Erie street.	From spring for drinking and from Erie Canal for boilers.	None.		
6	Utica Dyeing Co., Columbia and Schuyler streets.	None.			
7	Utica Knitting Co., Mill No. 2, Schuyler and Columbia streets.	None.			
8	Utica Steam & Mohawk Valley Cotton Mills, State and Columbia streets.	Erie Canal, fire pumps.....	Six connections, two single checks, covered three single checks in pits, one double check in pit.	Underwriters and weekly by mill.	None.
9	West End Brewery Co., Edwards street.	Nail Creek, pumped through pressure filter for condenser and fire.	Three connections; gate valve and single check on each.	Pump operated daily, gate valve closed.	None.
10	Oneida Brewery Co., State and Court streets.	Well, pumped for condenser.....	One connection; gate valve and single check.	Pump operated daily, gate valve closed.	None.
11	Globe Woolen Mills, Stark and Court streets.	Nail Creek, pumped for fire protection.	Two connections; two gate valves and single check on each.	See report.	
12	Linde Air Products Co., Schuyler and Walnut streets.	None.			
13	The Bossert Co., Hickory and West Ave.	None.			
14	Mott Wheel Works, Hickory street..	None.			
15	Utica Cutlery Compnay, Hickory and Wheeler avenue.	None.			
16	Utica Duxbak Corporation, Hickory & Wheeler avenue.	None.			
17	Heron Mfg. Co., Linden & West avenue.	None.			

*Number indicates location on appended map between pages 540 and 541.

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
		Analyses by Prof. Hodges																			
Utica	Oneida	Green and West ave	12/ 1/16															294	*+		
Utica	Oneida	Warren and York sts	12/ 1/16															182	*+		
Utica	Oneida	York and Court sts	12/ 1/16															307	*+		
		Analyses by the Division of Laboratories and Research																			
Utica	Oneida	1213 Warren st	12/ 8/16															70	+	−	−
Utica	Oneida	Warren and York sts	12/ 8/16															110	+	+	−
Utica	Oneida	1105 Ash st	12/ 8/16															160	+	+	−
Utica	Oneida	12 Faxton pl	12/ 8/16															45	+	+	−

* Presumptive.

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS		Bacteria per c.c.; gelatin 20°, 48 hours	B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
Utica	Oneida	Marcy, raw water	2/ 7/17	20	5	2 v.	2 v.	65	24	41	.072	.108	.002	.34	6.4	0.5	22.1	16	50	0+3—	0+3—	0+3—
Utica	Oneida	Marcy, treated	2/ 7/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	75	0+3—	0+3—	0+3—
Utica	Oneida	Deerfield, raw water	2/ 7/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	80	1+2—	1+2—	0+3—
Utica	Oneida	Deerfield, treated	2/ 7/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	40	0+3—	0+3—	0+3—
Utica	Oneida	Southern, raw water	2/ 7/17	12	2	1 v.	1 v.	90	28	62	.030	.080	.003	.16	4.3	1.5	60.0	56.0	90	1+2—	0+3—	0+3—
Utica	Oneida	Southern, treated	2/ 7/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	15	0+3—	0+3—	0+3—
Utica	Oneida	A. St. Luke's hospital	2/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14	0+3—	0+3—	0+3—
Utica	Oneida	B. Corner Court and West ave	2/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13	0+3—	0+3—	0+3—
Utica	Oneida	C. 1304 West ave	2/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	60	1+2—	0+3—	0+3—
Utica	Oneida	D. 1208 Stark st	2/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	70	1+2—	0+3—	0+3—
Utica	Oneida	E. 1009 Stark st	2/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	11	0+3—	0+3—	0+3—
Utica	Oneida	F. Corner Green and West ave	2/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	8	0+3—	0+3—	0+3—
Utica	Oneida	G. 906 Stark st	2/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	70	3+0—	0+3—	0+3—
Utica	Oneida	H. 818 Varick st	2/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	11	0+3—	0+3—	0+3—
Utica	Oneida	J. 644 Eagle	2/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	46	1+2—	0+3—	0+3—
Utica	Oneida	K. Hotel Utica	2/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	0+3—	0+3—	0+3—
Utica	Oneida	Nail creek, raw	2/14/17	....	....	....	....	....	....	....	....	....	....	....	....	10.0	....	....	800	3+0—	3+0—	3+0—
Utica	Oneida	*Nail creek, raw	2/19/17	35	10	2 a.	2 v.	....	....	....	.224	.73	.030	1.0	5.0	12.0	195.0	182.0	1,200	3+0—	3+0—	2+1—
Utica	Oneida	*Nail creek, filter effluent	2/19/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1,100	3+0—	3+0—	3+0—
Utica	Oneida	*City water near X connection	2/14 '17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	0+3—	0+3—	0+3—
Utica	Oneida	Erie canal, west city boundary	2/19/17	25	12	0	1 v.	....	....	....	.75	2.58	.024	.80	6.0	7.0	215.0	194.0	1,600	3+0—	3+0—	3+0—
Utica	Oneida	Erie canal, near 3rd ave	2/19/17	50	20	1 a.	2 v.	....	....	....	.60	.58	.060	.06	13.2	21.0	188.0	180.0	24,500	3+0—	3+0—	3+0—
Utica	Oneida	Ice from Erie canal	2/19/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7	0+3—	0+3—	0+3—

* West End Brewing Co.

WARSAW

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Warsaw, made by Mr. C. M. Baker, assistant engineer, on August 2, 1917.

Warsaw is an incorporated village of 3,424 inhabitants, located in Wyoming county on the Hornell-Buffalo branch of the Erie railroad, also on the B. R. & P. R. R., about 46 miles southeast of Buffalo and about the same distance southwest of Rochester. Oatka creek flows through the village. That portion of the village east of the creek is provided with a municipal sewer system, the remainder of the village being served by privies, cesspools, etc.

The water supply is owned by the municipality and is controlled by the board of trustees. The main supply is derived from the west fork of Oatka creek at a point about 5 miles south of the village. From the intake the water flows by gravity to a storage reservoir at Rock Glen, about 4 miles south of the village, thence to the distribution system in the village. No purification is employed. The western portion of the village near the Erie railroad station is supplied with water from a second reservoir fed by springs and known as the West Hill or Durchen reservoir. This reservoir is located about 2 miles northwest of the village.

The water supply system was first put in operation about 1895. Practically all of the population of the village is served with the water, there being in all some 1,000 service taps, of which only those supplying manufacturing concerns are metered. The distribution system consists of about 25 miles of mains ranging in size from 4 to 12 inches in diameter. The pressure in the village averages 110 to 120 pounds per square inch. Since no meters are provided or other method for measuring the amount of water used, no definite information could be obtained regarding the consumption.

The intake, which, as stated above, is located about 5 miles south of the village, consists of a small impounding reservoir formed by a dam across the bed of the stream. The storage reservoir located at Rock Glen is constructed by excavation and embankment and is lined with concrete. It is about 410 feet square and has a total capacity of approximately 10,000,000 gallons. The water enters the reservoir through a vertical pipe which acts as an aerator. The West Hill or Durchen reservoir is formed by a dam across a small ravine. Its capacity is roughly estimated at 4,000,000 gallons.

The watershed tributary to the main supply is about 2½ square miles in area. Its total population is approximately 65, which is equivalent to about 26 persons per square mile. For a distance of half a mile above the intake the banks of the stream are very precipitous. Above this point, however, the watershed consists of gently sloping land. It is used principally for farming and agricultural purposes. The houses are all located well back from the stream and there appears to be little opportunity for direct pollution of human origin except at times of a heavy storm or in the spring, when pollution may be carried into the streams from the farms located on the watershed. A large portion of the watershed in the vicinity of the streams is used as pasture land, however, in addition to which two roads cross it, and the supply is therefore subject to pollution of animal origin.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of the analyses of the tap sample show a water usually satisfactory with respect to color and turbidity but one that is very hard. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are usually low but those for nitrates and chlorine are above normal. The bacterial results show high counts at times with colon bacilli present in practically all of the 10 c.c. and frequently in the 1 c.c. inoculations, thus indicating the presence of active and potentially dangerous contamination. Regard-

ing the individual supplies, as indicated by the analyses of samples collected at the time of the inspection, the bacterial results show a high count for the sample collected from the Rock Glen supply with colon bacilli present in 2 of the 3 10 c.c. inoculations, while the samples collected from the West Hill reservoir show a moderate bacterial count and the absence of the B. coli type. As pointed out above, the Rock Glen supply is subject to considerable pollution from surface wash, which undoubtedly accounts for the pollution indicated by the analyses.

As a result of this investigation, it may be concluded:

1. That the main or Rock Glen supply is subject to considerable pollution by surface wash from farms located on the watershed, and consequently this supply cannot be considered safe for potable purposes at all times. Furthermore, as is true with all service supplies, there is the ever present possibility of accidental, incidental or wilful contamination by residents upon the watershed or by chance visitors thereto.
2. That the West Hill supply appears to be less subject to pollution than the Rock Glen supply, although it, too, may at times receive some pollution from surface wash from cultivated fields or pasture land.

In view of the above, I beg to offer the following recommendations to be acted upon by the village authorities:

1. That, with reference to the Rock Glen supply,
   (a) Purification be provided by means of filtration supplemented by sterilization with liquid chlorine.
   (b) That, pending the development of a complete purification plant, apparatus be provided and installed at once for sterilizing the supply with liquid chlorine.
2. That suitable drainage ditches be provided to divert surface wash from the West Hill or Durchen reservoir or that the watershed tributary to this supply be purchased by the village and enclosed by suitable fences to prevent possible pollution.

Although sterilization of the supply with liquid chlorine would not improve the physical qualities of the water, it would, if properly operated, render it temporarily safe from a sanitary standpoint. The cost of such an apparatus would be nominal and it is urged that the village officials give this matter their immediate attention.

Finally, I would recommend that copies of this report be sent to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 21, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Warsaw	Wyoming	Tap, public supply	1/17/12	5	5			150		119	.008	.022	Tr.	2.80	0.50	4.50	80.0	73.0	30	+	−	−
Warsaw	Wyoming	Tap, public supply	3/11/12	5	Cl.			167		140	.012	.060	.001	0.90	0.20	2.50	114.2	113.0	375	+	−	−
Warsaw	Wyoming	Tap, public supply	3/30/12	20	5			121		93	.030	.108	.001	0.70	3.90	2.00	85.8	84.0	1,500	+	+	−
Warsaw	Wyoming	Tap, public supply	9/27/12	10	Tr.			200		178	.004	.088	.001	0.60	3.50	2.50	142.8	123.0	450	+	+	−
Warsaw	Wyoming	Tap, public supply	11/20/12	15	1			173		148	.018	.104	Tr.	0.60	4.10	2.50	122.8	114.0	800	+	−	−
Warsaw	Wyoming	Tap, public supply	1/11/13	5	Tr.			138			.016	.042	.001	2.40	0.30	5.75	88.6	62.0	1,100	+	+	−
Warsaw	Wyoming	Tap, public supply	3/ 7/13	Tr.	Cl.			176			.010	.023	Tr.	2.80	0.70	5.00	74.3	66.0	90	+	−	−
Warsaw	Wyoming	Tap, public supply	4/18/13	5	Tr.			107			.012	.028	Tr.	3.20	0.70	3.25	70.0	51.0	160	−	−	−
Warsaw	Wyoming	Tap, public supply	6/ 6/13	Tr.	5			39			.006	.016	.001	2.50	0.70	4.75	77.1	68.0	3,600	+	−	−
Warsaw	Wyoming	Tap, public supply	9/ 2/13																2,600	+	−	−
Warsaw	Wyoming	Tap, Rock Glen supply	8/ 2/17	0	0	1 v.	2 g.				.004	.030	0	0.70	1.60	3.50	125.8	122.0	2,800	2+1−	0+3−	0+3−
Warsaw	Wyoming	West Hill or Durchen reservoir	8/ 2/17	0	0	2 v.	2 a				.020	.135	.008	0.60	3.50	3.50	74.3	71.0	100	0+3−	0+3−	0+3−

WATERFORD

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Waterford made on June 21, 1917, by Mr. E. S. Chase, assistant engineer.

Waterford is an incorporated village with a population of 3,047, located in the southeastern part of Saratoga county on the west bank of the Hudson river and on the main line of the Delaware and Hudson railroad about 12 miles north of Albany. It is the southern terminal of the Champlain canal and contains several underwear mills and one large valve foundry. The village is provided with a sewer system which discharges without treatment into the Hudson river.

The waterworks were first installed in 1885 and were then owned by a private company, who controlled and operated them until 1915, at which time the waterworks were purchased by the village. The supply was obtained from the Hudson river and pumped directly into the distribution system without purification. Upon purchase of the waterworks by the village steps were taken to install a modern purification plant, which was first put into operation on April 1, 1915. The supply was continued to be derived from the Hudson river but is now subjected to purification by means of a gravity mechanical filter plant supplemented with liquid chlorine for final sterilization. The filtration plant was built after the designs of Vrooman and Perry, consulting engineers of Albany, associated with Mr. George E. Willcomb, sanitary engineer of Albany. The contractor for the plant was the New York Continental Jewel Filtration Company of New York city.

Practically the entire population of the village is served by the supply, in addition to a small population in the town of Waterford outside of the village limits. The average daily consumption is approximately 500,000 gallons per day, about 30 per cent of which is used for industrial purposes. At times of extreme cold weather the consumption has reached 1,250,000 gallons per day, while on Sundays or holidays it occasionally reaches a minimum of 250,000 gallons per day. There are 11 miles of water mains ranging from 4 to 12 inches in diameter. Of the 900 service taps some 90 per cent are metered. The filtered water is pumped directly into the mains against an average pressure of 75 pounds per square inch maintained by two standpipes, which also serve to store the excess over consumption. One of these standpipes is located on a hill about three-fourths of a mile northwest of the village center while the other standpipe is located about 1¼ miles southwest of the village on a hill opposite the city of Cohoes. These standpipes are 24 feet in diameter by 85 feet high and 30 feet in diameter by 52 feet high with capacities of 297,000 and 276,000 gallons respectively.

The waterworks are under the control of the board of water commissioners, of which Mr. C. H. Kavanaugh is president, and under the direct charge of Mr. H. C. Curran, superintendent. The force employed in connection with the work consists of two filter operators and one engineer. The purification plant is also under the technical supervision of Mr. Willcomb.

The intake consists of a 12-inch cast iron pipe laid in a rock trench terminating at a point about 110 feet from shore in about 10 feet of water. Water from this intake pipe flows through an Elliott twin basket strainer with ⅜-inch mesh, located in a manhole on shore. After passing through this strainer the water is pumped to the coagulation basin by low lift centrifugal pumps. The filters, pumping equipment, repair shop and general office of the waterworks are located in one building. The low lift pumps consist of two Lawrence horizontal centrifugal pumps with capacities of 2,000,000 gallons per day each, direct connected to Troy vertical steam engines. The high service pumps consist of two combined duplex Worthington plunger pumps of 1,000,000 gallons, and 1,000,000 gallons daily capacity, respectively. These pumps are operated by steam generated in two horizontal return tubular boilers.

The coagulation and sedimentation basin into which the raw water is first pumped is constructed of concrete covered with a concrete roof and divided by a wall into two compartments. Each compartment is provided with a vertical baffle. The sulphate of aluminum used as a coagulant is applied to the raw water at the point of entrance to the basins. The basin is approximately 52½ feet by 24 feet in plan by 17 feet deep with a capacity of about 160,000 gallons. When the filters are operated at a rate of 500,000 gallons per day the period of detention in the tank is approximately 8 hours and the velocity of flow is about 1/10 feet per minute. The alum is applied at rates ranging from 1¼ to 4 grams per gallon, the smaller amounts being used in the winter and the larger amounts during the summer. The basin is cleaned about once a month by the regular force employed at the plant.

The alum is dissolved in two concrete tanks approximately 3 feet square by 3 feet deep, each provided with a bronze mixing paddle driven by water motor. From the solution tanks the alum is fed by gravity to float, operated constant level orifice boxes, thence by an injector through a line of rubber hose to the inlet of the coagulation basin. The amount of chemical applied is varied according to the character of the raw water to be dealt with, smaller amounts being used during the winter when the river is comparatively clear and low in color and the maximum amounts during the summer when the water carries considerable color or at times when the water is turbid. Provision is also made for adding soda ash or lime when the alkalinity in the effluent reaches 10.

After coagulation and sedimentation the water flows upon 4 units of gravity mechanical filters of the New York Continental Jewel type. Each unit consists of a concrete tank 15 by 12 feet in plan by 7 feet deep containing 8 inches of graded gravel and 30 inches of filtering sand overlying a manifold system of collecting pipe provided with perforated brass strainers. The gravel is ¼, ⅛ and 1/16 inch in size, and the sand has an effective size of 0.40 mm. and a uniformity coefficient of 1.5.

The water level is maintained 2 feet above the top of the filtering sand by means of a float, which regulates automatically the rate of pumping of the low lift pumps. The rate of filtration is regulated by rate controllers of the Simplex type. Under ordinary conditions the filters are operated from 6 A. M. to 6 P. M. with an hour out of service at noon. With this period of operation and with a daily consumption of 500,000 gallons the rate of filtration is approximately 65,000,000 per acre per day.

The filters are washed one at a time, at intervals varying from 3 to 9 hours, with an average interval of 6 hours. At the beginning of cleaning the sand is agitated for about 3 minutes with air forced through a separate system of manifold piping. This air is supplied by a Root rotary blower with a capacity of 50 cubic feet per minute under 5 pounds pressure operating against a back pressure of 3½ pounds per square inch. After air agitation the sand is washed with filtered water for about 5 minutes or until the wash water runs clear. The first filtrate after washing is run to waste for about 3 minutes. The amount of wash water used during each cleaning approximates 6 per cent of the amount of water filtered. During washing the wash water has a velocity of 10 inches vertical rise per minute. With the filters clean the initial loss of head is about 2 feet when the filters are operated at three-fourths rate and 3 feet when operated at full rate. When the loss of head reaches about 11 feet it is necessary to clean the filters.

After filtration the water enters a concrete clear water basin located beneath the filters. This basin is 52½ feet by 15 feet in plan, and 10 feet deep with a capacity of 60,000 gallons.

From this basin the water is pumped into the distribution system by the high service pumps.

Liquid chlorine is applied to the filtered water in the clear water basin at the suction line from the pumps. The apparatus for applying the chlorine consists of a float meter and absorption tower of the type manufactured by the Electro-Bleaching Gas Company. The chlorine is applied at rates ranging from .3 to .8 part per million with an average rate of application of .53 part per million.

Detailed records of operation and daily tests for color, alkalinity and carbon dioxide are made by the superintendent. Weekly bacterial analyses and inspections are made by Mr. Willcomb.

The Hudson river above the point of intake has a drainage area of 4,620 square miles with a total resident population of about 250,000, of which some 100,000 may be estimated as discharging raw sewage directly into the river or its tributaries. In addition to domestic sewage the river receives the industrial wastes from numerous manufacturing establishments located along its shores. The highly polluted character of the river water is well established and the prevalence of typhoid in Waterford during the use of the river as a public water supply without purification demonstrates the dangerous sanitary quality of the raw water.

In addition to the public supply, several mills in the village are provided with auxiliary pumps for fire protection which are supplied with polluted water from the Mohawk or Hudson rivers. These auxiliary fire supplies are cross connected with the city mains and separated therefrom by check valves. Cases are on record in this and other states where such valves have failed to work properly with consequent admission of polluted water from auxiliary sources into the general distribution system of the municipality and in some instances outbreaks of typhoid fever have resulted.

At the time of the inspection samples of the raw and treated waters were collected and the results of the analyses of these samples, together with others made in the past by the Division of Laboratories and Research will be found in the appended table.

The results of these analyses show a raw water very high in color and at times turbid. The hardness and alkalinity vary according to season. The total bacterial counts are usually high, although somewhat variable. Organisms of the B. coli type are usually prevalent in inoculations as small as 1/10 c.c. The sample of effluent collected at the time of the inspection was free from color and turbidity, the total bacterial count was very low and no organisms of the B. coli type were isolated from the samples tested.

In view of the above facts the following conclusions may be drawn:

1. That the purification works for the public water supply of the village of Waterford appeared to be so designed and operated as to afford a safe supply of potable water for this village.

2. That there is danger of contamination of the water in the mains through cross connections between the village supply and the auxiliary fire supplies derived from polluted sources from industrial establishments in the village. Contamination of water supplies in this manner has occurred in several instances and in some cases epidemics of typhoid fever have been traceable to such contamination.

I would therefore recommend:

1. That at the earliest practicable time a complete severance be made and maintained between the mains of the public water supply and the mains of the mills whose auxiliary fire supplies are derived from sources of unsafe sanitary quality.

2. That until the preceding recommendation is carried out all such cross connections be carefully inspected at regular and frequent intervals, in order to reduce to a minimum the danger of contamination of the public water supply from such sources.

I would further recommend that copies of this report be sent to the local health officer, to the sanitary supervisor of the district, and to the board of water commissioners.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 14, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ATNBES		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
*Waterford....	Saratoga.....	Tap, public supply.....	1/18/13	25	5	....	....	75	....	....	.014	.090	.002	0.24	13.4	1.50	23.0	13.4	1,200	+	+	+
*Waterford....	Saratoga.....	Tap, public supply.....	3/ 7/13	30	5	....	....	93	....	....	.018	.098	.001	0.20	14.4	2.75	34.0	14.4	1,200	+	+	+
*Waterford....	Saratoga.....	Tap, public supply.....	4/24/13	25	10	....	....	86	....	....	.028	.098	.001	0.06	9.6	3.75	23.0	9.6	2,000	+	+	+
*Waterford....	Saratoga.....	Tap, public supply.....	6/28/13	45	7	....	....	122	....	....	.010	.144	.001	0.10	19.2	3.25	41.0	19.2	800	+	+	+
*Waterford....	Saratoga.....	Tap, public supply.....	4/10/14	20	80	....	....	93	....	69	.016	.174	.001	0.20	12.6	1.37	28.6	23.0	6,200	+	+	+
†Waterford....	Saratoga.....	Tap, public supply.....	5/23/17	0	0	2 v.	2 a.	....	....	....	.012	.050	.000	0.10	8.7	2.75	37.7	14.0	25	0+3—	0+3—	0+3—
†Waterford....	Saratoga.....	Raw water.....	6/21/17	45	15	2 v.	2 e.	....	....	....	.012	.138	.000	0.06	15.5	1.75	28.6	25.0	800	3+0—	3+0—	3+0—
†Waterford....	Saratoga.....	Coagulation basin effluent...	6/21/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	200	3+0—	3+0—	3+0—
†Waterford....	Saratoga.....	Filter effluent.....	6/21/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	35	3+0—	1+2—	0+3—
†Waterford....	Saratoga.....	Final effluent, chlorinated...	6/21/17	0	0	0	0	....	....	....	.028	.052	.000	0.06	4.6	2.5	30.0	10.0	5	0+3—	0+3—	0+3—

* Prior to installation of purification plant. † Subsequent to installation of purification plant.

WATERVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Waterville, made by Mr. C. M. Baker, assistant engineer, on April 10, 1917.

Waterville is an incorporated village of 1564 inhabitants, located in Oneida county, on the Utica branch of the D. L. & W. R. R., about 20 miles southwest of the city of Utica. There are several private sewer systems in the village which discharge without treatment into a small brook. The majority of the houses, however, are served by privies and cesspools.

The water supply is owned and operated by the municipality and is obtained from two impounding reservoirs, located about 2 miles east of the village, near the head of a small brook. The supply was first put in operation in 1887, at which time the first reservoir was constructed on the south fork of the brook. Later about 1909, a second reservoir was constructed on the north fork of the brook and this now constitutes the regular supply, the old reservoir being held in reserve. From these reservoirs the water flows through settling basins and a charcoal or gravel filter, thence by gravity to the village. About 95 per cent of the population of the village is served with the water, there being in all some 452 service taps, 120 of which are metered. The distribution system consists of about 10 miles of water mains, ranging in size from 4 to 12 inches in diameter. Due to the limited number of meters and lack of other methods of measuring the water used no definite data could be obtained regarding the consumption, but based on a per capita rate of 100 gallons per day, the total daily consumption would be about 150,000 gallons. The pressure from the old supply or old reservoir is about 76 pounds per square inch in the village, while from the new reservoir it is about 126 pounds. Arrangements are made whereby water can be drawn directly from the new reservoir in case of fire, thus obtaining the benefit of the higher pressure. The fire apparatus of the village consists of 1,400 or 1,500 feet of fire hose and a hose cart.

The reservoirs are formed by the construction of earthen dams with concrete core walls across the stream. Just below the old reservoir are 2 smaller reservoirs or settling basins also formed by the construction of a dam. A 16-inch pipe leads from the storage reservoir to a gate house located below the settling basins. By means of valves the water from the reservoirs may be wasted into the creek below or may be discharged into the northern of the two settling basins, or into what is locally termed the aerating basin. From this basin the water flows through a charcoal or gravel filter into the second basin, thence by gravity to the distribution system. The capacity of the old reservoir is about 9,000,000 gallons, of the aerating basin, 3,000,000 gallons, and of the distribution basin, 2,000,000 gallons. The water from the new reservoir, which is located about three-fourths of a mile northeast of the old reservoir, is conducted by gravity to the gate house from which the water may be discharged into the aerating basin, thence through the filter into the distribution basin and to the village, or the settling basins and filter may be by-passed and the water discharged directly into the main leading to the village. The intake in the distribution basin consists of an "L" pipe, which is covered by a screen and extends for some distance above the bottom of the basin. The reservoirs are usually cleaned during the spring when there is an abundant supply of water. The mains are flushed when necessary, usually 4 to 6 times each year.

The area of the watershed tributary to the old reservoir is about three-fourths of a square mile, and of the new reservoir about one-third of a square mile, thus giving a total area tributary to the supply of a little over one square mile. There is no population on the watershed of the new reservoir, but on that of the old reservoir there are 10 people, an equivalent to 13 per square mile. The slopes of the watersheds are steep and the area is used principally for pasture and agricultural purposes. A limited amount of land about the reservoirs is owned by the village.

The general sanitary condition of the watersheds appeared to be satisfactory at the time of the inspection except at the Morgan farm, which is located on the old watershed about three-eighths of a mile above the reservoir. The buildings at this place are located at the top of a steep slope leading to the stream about 700 feet distant. The privy is at the top of the slope and only about 100 feet from a natural drain leading to the brook. No vault is provided and fecal matter was noticed on the ground at the time of the inspection. Apparently regular inspections are not made of the watershed, although frequently during the year members of the village board visit the watershed.

Samples of the water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses indicate a water at times somewhat colored and turbid but moderate in hardness. The figures for nitrogen in its various forms are moderate, and although the bacterial counts are not excessive colon bacilli are at times present in 10 c.c. and occasionally in 1 c.c. inoculations. The samples collected at the time of the inspection showed a moderate bacterial count in the water collected from the new reservoir with the colon type absent. The sample collected from a tap in the village which is this same supply after passing through the sedimentation basin and filter showed a somewhat lower bacterial content. Analyses of the sample collected from the old reservoir showed a high bacterial count with colon bacilli present in 10 c.c. inoculations. It appears, therefore, both from the analyses and the sanitary survey, that the pollution probably comes principally from the old reservoir. It is the intention of the village, however, not to use water from this source regularly, in view of the fact that the new reservoir should furnish sufficient water under ordinary conditions.

As a result of this investigation it may be concluded:

1. That the new water supply of Waterville is derived from a source which is fairly free from pollution, although as is true of all surface supplies there are always opportunities for accidental, incidental or wilful pollution by chance visitors to the watersheds.
2. That, however, the old supply is more particularly subject to pollution from insanitary conditions existing on the premises known as the Morgan farm, located on the watershed.
3. That although the filter probably assists in removing turbidity from the water its bacterial efficiency is practically nil.

In view of the above, I beg to offer the following recommendations to be acted upon by the village officials:

1. That regular inspections be made of the insanitary conditions on the watersheds tributary to the supply.
2. That the privy at the Morgan farm be provided with a watertight container and that the contents therefrom be properly disposed of.
3. That water be drawn from the old reservoir only in case of necessity, and that prior to its use a thorough inspection be made of the watershed in order to abate any insanitary conditions which may exist.
4. That, if at any time difficulties are encountered in maintaing proper sanitary conditions on the watersheds, the village authorities may make application to this Department for the enactment of rules and regulations protecting the sanitary quality of the supply.
5. That, should it seem impracticable to properly control the sanitary conditions on the watersheds consideration be given to the sterilization of the supply with liquid chlorine.

Finally, I would recommend that copies of this report be transmitted to the local authorities, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 31, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)										BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Waterville	Oneida	Tap, public supply	2/19/12	18	8	....	....	74	....	64	.024	.050	Tr.	0.24	3.09	0.50	53.6	31.0	80	+	−	−
Waterville	Oneida	Tap, public supply	5/ 2/12	15	15	....	....	51	....	30	.002	.066	Tr.	0.14	1.50	0.50	22.1	16.0	200	+	−	−
Waterville	Oneida	Tap, public supply	10/24/12	15	5	....	....	111	....	98	.014	.124	Tr.	0.08	3.30	0.75	74.3	65.0	400	+	−	−
Waterville	Oneida	Tap, public supply	1/ 4/13	35	15	....	....	70	....	....	.003	.110	Tr.	0.12	3.00	0.25	29.9	26.0	1,200	+	−	−
Waterville	Oneida	Tap, public supply	6/25/13	15	2	....	....	81	....	....	.010	.084	Tr.	0.14	1.70	2.00	41.6	37.0	.....	+	+	−
Waterville	Oneida	Old reservoir	4/10/17	5	5	1 v.	1 v.	....	....	....	.022	.047	Tr.	Tr.	2.20	1.75	26.0	19.0	1,300	2+1−	0+3−	0+3−
Waterville	Oneida	New reservoir	4/10/17	Tr.	Cl.	1 v.	1 v.	51.0	16.0	35.0	.019	.023	Tr.	Tr.	0.60	0.50	162.5	158.0	230	0+3−	0+3−	0+3−
Waterville	Oneida	Tap in village	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	.....	35	0+3−	0+3−	0+3−

WATERVLIET

The public water supply of the city of Watervliet has received a great deal of attention in the past from this Department. Numerous inspections, analyses, letters of advice and public addresses have been given in an endeavor to impress upon the citizens and officials the necessity of securing a water supply of safe and wholesome quality.

In 1914 contracts were let for the construction of a new system of water supply consisting of a large impounding reservoir on the Normanskill at French's Mills, several miles west of Watervliet; a water power pumping station at this reservoir; 15 miles of wooden stave pipe line; a 15,000,000 gallon raw water storage reservoir, 2 miles west of the city; a gravity mechanical filter plant; clear water basin and a new pipe line to the distribution system.

Pending the completion of this new system, the old supply derived by pumping directly from the Mohawk river at Dunsbach Ferry was continued and at times a supplementary supply was derived from the Hudson river by pumping from a point opposite the city. In 1916, at the urgent advice of this Department, liquid chlorine apparatus were installed at both the Mohawk and Hudson pumping stations. Several inspections of these plants were made during the year and advice given with respect to their proper operation.

During the early part of July, 1917, inspections were made of the chlorination plant at the Mohawk pumping station and samples collected for analyses. Later in the month, information received through the daily press indicated that steps were about to be taken by the city officials to augment the supply from the Mohawk, which was proving insufficient for the needs of the city, by pumping from the Hudson river. A letter dated July 13, 1917, was accordingly sent to the board of water commissioners, pointing out the necessity for placing the chlorination plant for this auxiliary supply in proper operating condition, and warning against the admission of untreated Hudson river water into the distribution system. Following this letter, information was received from the board of water commissioners that action would be taken as suggested, but this Department was not informed at the time the Hudson plant was put into operation. On August 6, 1917, the results of the analyses of the samples of the chlorinated Mohawk supply were transmitted to the city authorities and the need of increasing the amount of chlorine was pointed out. A letter was received from the local authorities, stating that our recommendations would be carried out.

On September 15 a rumor reached the attention of the Engineering Division that an unusual number of typhoid fever cases had developed in Watervliet. The matter was at once taken up with the Division of Communicable Diseases, which immediately started an investigation, which soon disclosed the fact that a great many cases of typhoid had occurred in the city, although very few had at that time been reported.

On September 17, the Engineering Division made an inspection relative to the water supply situation. It was found that the water from the Hudson river was being pumped, after treatment with liquid chlorine, directly into the distribution system from an emergency pumping plant located at the old electric light plant near the city hall. Analyses of samples from both supplies indicated that the sterilization of the Mohawk supply was somewhat inadequate and that the treatment of the Hudson supply was bringing about practically no purification. Upon further investigation it was found that not only was the capacity of the Hudson river pump larger than that upon which the rate of chlorine application had been estimated by the local authorities, but that the organic content of the river water was so high that the chlorine was immediately absorbed without producing bacterial reduction.

In view of the seriousness of the situation, the investigation of the Division of Communicable Diseases indicating the occurrence of a large number of typhoid cases, directions were given for an assistant engineer to visit the

Hudson river chlorination plant each day and the Mohawk plant somewhat less frequently. By careful checking the operation and by gradually increasing the amount of chlorine applied, the efficiency of the sterilization was improved, and on September 22, a practically sterile water was obtained with both supplies, the total bacterial counts being low and organisms of the B. coli type being absent. Thereafter satisfactory results were obtained for the most part. At times, however, owing to the carelessness on the part of the local authorities, or due to accidents of the chlorination apparatus the supplies were inadequately sterilized. Nevertheless, it may be stated that from the 22d of September until the new supply was put into service, about the first part of December, the water supply of Watervliet was reasonably safe the greater part of the time. About the first of December, however, difficulties were experienced with the operation of the pumping plants and with the operation of the chlorination apparatus, but about this time the new supply was being put into service, and the water in the distribution system was derived in part from the relatively safer Normanskill supply.

During the supervision of the operation of the chlorination plants by the Engineering Division, the epidemiological investigation by the Division of Communicable Diseases was proceeding. Some 169 cases of typhoid fever were found to have occurred in the city of Watervliet during the outbreak. The information secured pointed to the public water supply as one common source of infection and a certain public well as another possible source. Watervliet, owing to the unsatisfactory condition of the public supply, had been provided with numerous public and private wells which are sunk for a comparatively few feet through porous shale, and in nearly all cases are seriously polluted. On November 1 the Engineering Division was directed to make a survey of these wells and immediately proceeded to do so. Samples were collected from every public well in use and upon the receipt of the results of analyses, made by the Division of Laboratories and Research, steps were taken on November 3, through the local officials, to close these wells found to be most grossly contaminated.

In connection with the typhoid outbreak the following dates are significant: On July 24 the Hudson river water was first pumped into the mains; on September 15 the first information regarding the typhoid outbreak reached this Department; on September 21 the well, which the evidence indicated as being the source of infection for a large number of cases, was closed, and on September 22 the first effective sterilization of the public water supply was obtained. In June and July only 5 cases of typhoid were reported from Watervliet, while there were 35 cases with onsets in August; 96 in September, and 38 in October, whereas only 8 were reported in November.

About the middle of November, the work on the new waterworks had reached the point where water had been delivered to the raw water reservoir near the filter plant. It was found, however, that owing to leaks which had developed in the coagulation basins of the filters, it would be impossible to operate immediately. In order to secure a supply of better quality, and in order to obviate, if possible, the use of the grossly polluted Hudson at the earliest moment, it was suggested that the city secure permission from the State Conservation Commission for a temporary by-pass around the filter plant. This permission was obtained, but some time elapsed before advantage was taken by the city of this permission. It was advised by this Department that the unfiltered Normanskill supply be sterilized with liquid chlorine or hypochlorite, but no immediate action was taken to follow out this advice for some little time after the admission of the Normanskill supply into the city distribution mains, despite the fact that the city was experiencing a most serious outbreak of typhoid, due to the use of contaminated water. Finally, the filters were put into shape and used without the preliminary coagulation basins being in service. About the first of December it became impossible to operate the pump at the Hudson river plant, and about the 10th of December operation of the Mohawk plant was given up. On December 6, the chlorination plant for the sterilization of the Normanskill supply was put into service and has been in use, presumably, ever since.

UNIVERSITY OF ILLINOIS LIBRARY

STATE DEPARTMENT OF HEALTH—ENGINEERING DIVISION—WATERVLIET—PUBLIC WATER SUPPLY

ANALYTICAL RESULTS IN CONNECTION WITH OPERATION OF CHLORINE PLANTS

HUDSON RIVER SUPPLY

Date	Time	P. P. M. Cl. Applied	P. P. M. Cl. Excess	Raw water: Oxygen consumed	Raw water: Bacteria per c.c.	Raw water: B. Coli 1–10	Raw water: B. Coli 1–100	Raw water: B. Coli 1–1000	Chlorinated water: Oxygen consumed	Chlorinated water: Bacteria per c.c.	Chlorinated water: B. Coli 10	Chlorinated water: B. Coli 1	Chlorinated water: B. Coli 1/10	Remarks
Sept. 17	P. M.	0.33	.....	.....	66,000	3+0—	3+0—	.....	13.7	35,000	3+0—	3+0—	3+0—	.....
20	10.10 A. M.	0.37	.....	.....	33,000	3+0—	3+0—	.....	.....	25,000	3+0—	3+0—	3+0—	..... 11.10 A. M.
21	2.30 P. M.	0.84	0.01	.....	53,000	3+0—	3+0—	.....	.....	5,200	3+0—	3+0—	3+0—	..... 3.35 P. M.
22	10.45 A. M.	2.14	0.03	.....	10,500	3+0—	3+0—	.....	.....	15	0+3—	0+3—	0+3—	.....
23	10 A. M.	1.97	0.05	.....	.....	.....	.....	.....	25.8	.....	.....	.....	.....	.....
Sept. 24	11.15 A. M.	1.21	0.01	.....	20,000	3+0—	3+0—	.....	.....	100	0+3—	0+3—	0+3—	.....
25	2.05 P. M.	1.59	0.03	29.4	7,000	3+0—	3+0—	.....	.....	20	0+3—	0+3—	0+3—	..... 12.30 P. M.
26	4.40 P. M.	1.98	0.18	.....	15,000	3+0—	3+0—	.....	.....	10	0+3—	0+3—	0+3—	..... 3.05 P. M. Pump out of service 12.30 P. M.– 4.40 P. M.
27	3.30 P. M.	1.18	0.05	.....	9,500	3+0—	3+0—	.....	.....	25	0+3—	0+3—	0+3—	..... 3.05 P. M.
28	3.40 P. M.	1.35	.....	33.2	29,500	3+0—	3+0—	.....	.....	750	3+0—	3+0—	3+0—	..... 2.45 P. M.
Sept. 28	4.45 P. M.	1.66	0.03	.....	.....	.....	.....	.....	.....	30	3+0—	1+2—	0+3—	.....
29	10.45 A. M.	1.66	0.08	.....	61,000	3+0—	3+0—	.....	.....	200	3+0—	3+0—	1+2—	.....
30	12.30 P. M.	1.50	0.01	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service 8.30 A. M.–11 A. M.
Oct. 1	8.40 A. M.	1.48	0.12	.....	38,000	3+0—	3+0—	.....	.....	80	3+0—	3+0—	0+3—	..... Increase Cl. to 1.78 p. p. m. 9 A. M.
2	3.15 P. M.	1.71	0.01	.....	25,000	3+0—	3+0—	.....	.....	10	2+1—	0+3—	0+3—	..... 2.10 P. M.
3	4.15 P. M.	1.31	0.32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	4.50 P. M.	1.85	0.12	.....	60,000	3+0—	3+0—	.....	.....	15	0+3—	0+3—	0+3—	..... 1.03 P. M.
5	11.30 A. M.	1.44	0.14	.....	23,000	3+0—	3+0—	.....	.....	20	0+3—	0+3—	0+3—	..... 12.03 M.
6	11.40 A. M.	2.18	0.24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... 11.03 A. M.
Oct. 7	10.00 A. M.	2.51	0.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	10.30 A. M.	2.67	0.14	.....	3,000	3+0—	3+0—	.....	.....	25	0+3—	0+3—	0+3—	..... Pump out of service 11.30 A. M.– 1.45 A. M. now 10
9	2.30 A. M.	1.99	0.05	.....	3,500	3+0—	3+0—	.....	.....	5	0+3—	0+3—	0+3—	..... Pump out of service 9 A. M.–3.20 A. M.
10	12.45 A. M.	2.67	0.12	33.4	11,000	3+0—	3+0—	3+0—	32.8	20	0+3—	0+3—	0+3—	..... 3.25 A. M.
11	11.25 A. M.	1.99	0.08	.....	24,000	3+0—	3+0—	.....	.....	20	0+3—	0+3—	0+3—	..... 11.45 A. M.
Oct. 12	3.00 P. M.	1.83	0.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... 10.03 A. M.
13	3.50 P. M.	2.05	0.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... 4.45 P. M.
14	10.30 A. M.	2.85	0.32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service .....8 A. M.–10.15 A. M.
15	9.00 A. M.	1.70	0.03	25.6	6,500	3+0—	3+0—	0+3—	24.8	40	2+1—	0+3—	0+3—	.....
16	9.00 A. M.	2.05	0.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oct. 17	3.45 P. M.	2.14	0.17	.....	2,500	3+0—	3+0—	0+3—	.....	90	3+0—	1+2—	0+3—	..... 2.55 P. M.
18	10.30 A. M.	2.01	0.23	.....	17,000	3+0—	3+0—	3+0—	.....	20	0+3—	0+3—	0+3—	..... 9.30 A. M.
19	4.30 P. M.	2.32	0.22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
20	9.00 A. M.	2.12	0.21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
21	4.00 P. M.	2.30	0.39+	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oct. 22	9.00 A. M.	2.03	0.24	20.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
23	10.45 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump has been out of service 8 A. M.– 12.15 P. M.
23	11.00 A. M.	1.70	0.15	.....	2,500	3+1—	3+0—	0+3—	21.2	30	0+3—	0+1—	0+3—	.....
24	3.30 P. M.	1.50	0.73	.....	10,500	3+0—	3+0—	2+1—	20.4	55	0+3—	0+3—	0+3—	.....
25	4.35 P. M.	2.80	0.60+	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service 1.40 P. M.–3 P. M.
Oct. 26	1.35 P. M.	1.83	0.60	.....	12,300	3+0—	3+0—	1+2—	.....	70	0+3—	0+3—	0+3—	..... Pump out of service 5 hours..... 3.53 P. M.
27	9.50 A. M.	2.00	0.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	9.30 A. M.	0.95?	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service nearly all night
29	2.45 P. M.	1.50	0.10	.....	6,700	3+0—	3+0—	1+2—	12.4	170	2+1—	1+2—	0+3—	..... Water turbid from heavy rains
30	2.35 P. M.	.....	0.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... River very high and turbid
Oct. 31	2.55 P. M.	.....	0.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	2.30 P. M.	2.10	0.15	.....	17,000	3+0—	1+2—	0+3—	.....	100	0+3—	0+3—	0+3—	..... Reservoir [illegible] normal; [illegible] height [illegible]
Nov. 1	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... [illegible] down
2	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov. 3	10.30 A. M.	1.30	0.30	.....	8,000	3+0—	2+1—	0+3—	.....	75	0+3—	1+3—	0+3—	..... River flow about normal
4	9.30 A. M.	1.95	0.45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Chlorine tank became empty in early A. M. Attach new cylinder
5	2.15 A. M.	1.70	0.12	14.8	9,900	3+0—	3+0—	1+2—	14.4	70	0+3—	0+3—	0+3—	.....
6	10.30 A. M.	1.70	0.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... 12.00 M.
7	4.15 P. M.	1.20	0.18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov. 8	4.45 P. M.	2.10	0.10	.....	3,400	3+0—	3+0—	1+2—	11.6	70	0+3—	0+3—	0+3—	..... 3.45 P. M.
9	11.00 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Chlorine apparatus out of service, repair and place in operation
	12.35 P. M.	.....	0.55	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	5.00 P. M.	.....	70.59	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10	12.00 M.	1.90	0.35	.....	12,000	3+0—	3+0—	3+0—	.....	20	0+3—	0+3—	0+3—	..... 11.20 A. M.
Nov. 11	9.50 A. M.	2.40	0.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12	4.30 P. M.	2.40	0.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13	1.30 P. M.	1.60	0.01	.....	2,400	3+0—	3+0—	3+0—	.....	20	0+3—	0+3—	0+3—	.....
14	3.50 P. M.	.....	0.24	.....	2,100	3+0—	2+1—	0+3—	.....	25	0+3—	0+3—	0+3—	..... 3.03 P. M.
15	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service
16	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
17	11.50 A. M.	.....	Tr.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
18	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov. 20	11.00 A. M.	2.2	0.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Chlorine shut off; correct and start apparatus
21	4.30 P. M.	2.2	0.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Apparatus clogged [illegible] leaks
22	4.00 P. M.	2.2	0.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Changes made O. K.
23	12.00 M.	2.3	0.10	.....	5,100	.....	2+1—	2+1—	.....	10	0+3—	0+3—	0+3—	..... 1.30 P. M.
24	4.40 P. M.	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov. 25	11.15 A. M.	1.2	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Chlorine supply exhausted; obtain new cylinder and [illegible]
	1.00 P. M.	.....	0.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Apparatus changed to boiler room
27	4.00 P. M.	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Scale out of order
28	4.00 P. M.	.....	0.07	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service 12 M.–3.45 P. M.
29	3.30 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service
30	3.45 P. M.	.....	0.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service part of time

Probably no water pumped from Hudson river after Nov. 30.
Observers E. S. Chase and C. M. Baker.

MOHAWK RIVER SUPPLY

Date	Time	P. P. M. Cl. Applied	P. P. M. Cl. Excess	Raw water: Oxygen consumed	Raw water: Bacteria per c.c.	Raw water: B. Coli 1	Raw water: B. Coli 1/10	Raw water: B. Coli 1/100	Chlorinated water: Oxygen consumed	Chlorinated water: Bacteria per c.c.	Chlorinated water: B. Coli 10	Chlorinated water: B. Coli 1	Chlorinated water: B. Coli 1–10	Remarks
Sept. 17	P. M.	0.72	.....	9.2	550	3+0—	0+3—	.....	9.2	100	1+2—	0+3—	0+3—	.....
20	10.10 A. M.	0.87	.....	.....	450	3+0—	3+0—	.....	.....	50	0+3—	0+3—	0+3—	..... 11.10 A. M.
21	2.30 P. M.	0.77	0.14	.....	320	3+0—	0+3—	.....	.....	30	0+3—	0+3—	0+3—	..... 3.35 P. M.
22	10.45 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
23	10 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sept. 24	11.15 A. M.	1.01	0.03	.....	450	3+0—	2+1—	.....	.....	40	0+3—	0+3—	0+3—	.....
25	2.05 P. M.	0.93	0.14	11.6	325	3+0—	1+2—	.....	.....	40	0+3—	0+3—	0+3—	..... 12.30 P. M.
26	4.40 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... 3.05 P. M. Pump out of service 12.30 P. M.– 4.40 P. M.
27	3.30 P. M.	1.01	0.15	.....	325	3+0—	1+2—	.....	.....	30	0+3—	0+3—	0+3—	.....
28	3.40 P. M.	1.64	0.33	.....	230	3+0—	2+1—	.....	.....	35	0+3—	0+3—	0+3—	..... 4.03 P. M.
		1.49	0.32	9.6	375	3+0—	3+0—	.....	10.0	20	0+3—	0+3—	0+3—	..... 2.45 P. M.
Sept. 28	4.45 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29	10.45 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	12.30 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service 8.30 A. M.–11 A. M.
Oct. 1	8.40 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Increase Cl. to 1.78 p. p. m. 9 A. M.
2	3.15 P. M.	0.89	0.27	.....	400	3+0—	3+0—	.....	.....	15	0+3—	0+3—	0+3—	..... 2.10 P. M.
3	4.15 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	4.50 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	11.30 A. M.	0.93	0.20	.....	2,400	2+1—	0+3—	.....	.....	25	0+3—	0+3—	0+3—	..... 1.03 P. M.
6	11.40 A. M.	0.99	0.19	.....	85	2+0—	0+3—	.....	.....	35	0+3—	0+3—	0+2—	..... 12.03 M.
		0.95	0.24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... 11.03 A. M.
Oct. 7	10.00 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	10.30 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9	2.30 A. M.	0.67	0.24	.....	700	3+0—	3+0—	.....	.....	10	0+3—	0+3—	0+3—	.....
10	12.45 A. M.	1.11	.....	.....	325	3+0—	0+3—	.....	.....	60	0+3—	0+3—	0+3—	.....
11	11.25 A. M.	1.03	0.10	16.0	600	3+0—	2+1—	.....	8.8	10	0+3—	0+3—	0+2—	.....
		1.03	0.16	.....	375	3+0—	2+1—	.....	.....	40	0+3—	0+3—	0+3—	.....
Oct. 12	3.00 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13	3.50 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
14	10.30 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
15	9.00 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16	9.00 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oct. 17	3.45 P. M.	.....	.....	.....	3,200	3+0—	2+1—	2+1—	.....	35	0+3—	0+3—	0+3—	.....
18	10.30 A. M.	0.83	0.14	.....	1,900	3+0—	3+0—	.....	.....	10	0+3—	0+3—	0+3—	..... 2.55 P. M.
19	4.30 P. M.	0.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... 9.30 A. M.
20	9.00 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service 1.50 A. M.– 2.40 A. M.
21	4.00 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service 9 A. M.–2 P. M.
Oct. 22	9.00 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
23	10.45 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
23	11.00 A. M.	1.11	.....	.....	18,500	3+0—	3+1—	3+0—	.....	30	0+3—	0+3—	0+3—	.....
24	3.30 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
25	4.35 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oct. 26	1.35 P. M.	0.95	.....	.....	6,400	3+0—	3+0—	.....	.....	55	0+3—	0+3—	0+3—	.....
27	9.50 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	9.30 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29	2.45 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	2.35 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oct. 31	2.55 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	2.30 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov. 1	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov. 3	10.30 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	9.30 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	2.15 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	10.30 A. M.	1.07	0.09	8.4	2,600	3+0—	3+0—	3+0—	8.4	40	0+3—	0+3—	0+3—	..... 12.00 M.
7	4.15 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov. 8	4.45 P. M.	.....	.....	.....	16,000	3+0—	3+0—	.....	.....	2,700	3+0—	3+0—	3+0—	..... 3.45 P. M.
9	11.00 A. M.	.....	0.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	12.35 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	5.00 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10	12.00 M.	.....	0.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... 11.20 A. M.
Nov. 11	9.50 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12	4.30 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13	1.30 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
14	3.50 P. M.	.....	0.14	.....	5,000	3+0—	2+1—	1+2—	.....	11,000	3+0—	3+0—	0+0—	..... 3.03 P. M.
15	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..... Pump out of service
16	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
17	11.50 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
18	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov. 20	11.00 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
21	4.30 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
22	4.00 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
23	12.00 M.	.....	.....	.....	7,000	3+0—	3+0—	0+3—	.....	7,700	3+0—	3+0—	3+0—	.....
24	4.40 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov. 25	11.15 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1.00 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
27	4.00 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	4.00 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29	3.30 A. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	3.45 P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Difficult to operate Mohawk pump during entire month of November. Amount of chlorine used not as large as advised.
No water pumped from Mohawk river after Dec. 10.

MIXED AND MISCELLANEOUS

Date	Source	Oxygen consumed	Bacteria per c.c.	B. Coli 10	B. Coli 1	B. Coli 1/10
Sept. 17	Tap, City Hall	.....	6,600	3+0—	3+0—	3+0—
17	Tap, Menands	.....	900	3+0—	3+0—	3+0—
29	Tap, Menands	.....	600	3+0—	3+0—	1+2—
Oct. 23	Tap, 1283 2d avenue	12.0	850	0+3—	0+3—	0+3—
24	Hudson river water at intake	.....	10,500	1–100	1–1000	.....
				3+0—	2+1—	.....
.....	Hudson river, 10 ft. from intake	.....	4,800	2+1—	2+1—	.....
.....	Hudson river, 25 ft. from intake	.....	5,300	3+0—	1+2—	.....
.....	Hudson river, 50 ft. from intake	.....	6,800	3+0—	1+2—	.....
.....	Hudson river, 100 ft. from intake	.....	2,500	1+2—	0+3—	.....
.....	Hudson river, 200 ft. from intake	.....	2,700	3+0—	0+3—	.....
.....	Tap, 3d ave. & 8th st.	.....	45	0+3—	0+3—	0+3—
.....	Tap, 3d ave. & 12th st.	10.4	65	0+3—	0+3—	0+3—
.....	Tap, 5th ave. and 14th st.	.....	55	2+0—	0+3—	0+3—
.....	Tap, 7th ave. and 19th st.	11.2	325	2+1—	1+2—	1+3—
.....	Tap, Broadway and 17th st.	.....	193	1+2—	0+3—	0+3—
.....	Tap, 8th ave. and 12th st.	.....	110	3+0—	1+2—	1+2—
.....	Tap, 3d ave. and 15th st.	.....	250	2+1—	0+3—	0+3—
23	Tap, 3d ave. and 8th st.	.....	65	0+3—	0+3—	0+3—
.....	Tap, 7th ave. and 19th st.	.....	235	0+3—	3+3—	0+3—
.....	Tap, Broadway and 17th st.	.....	135	0+3—	0+3—	0+3—
29	Tap, 3d ave. and 24th st.	8.8	1,600	2+1—	1+2—	0+3—
.....	Tap, 2d ave. and 19th st.	9.2	1,300	2+1—	1+2—	0+3—
.....	Tap, 3d ave. and 8th st.	10.8	430	3+0—	3+0—	2+1—
31	Tap, 3d ave. and 8th st.	.....	200	3+3—	0+3—	0+3—
.....	Tap, 7th ave. and 19th st.	.....	2,500	3+0—	3+0—	1+2—
.....	Tap, 3d ave. and 1st. st.	.....	2,500	3+0—	3+0—	3+0—
Nov. 3	Tap, 1621 2d ave	.....	75	2+0—	0+3—	0+3—
13	Tap, City Hall	.....	850	3+0—	3+0—	1+2—
14	Tap, Menands	.....	5,500	3+0—	1+2—	0+3—
.....	Tap, 7th ave. and 19th st.	.....	35	0+3—	0+3—	0+3—
23	Tap, 3d ave. and 8th st.	.....	260	2+1—	1+2—	0+3—
.....	Tap, 7th ave. and 19th st.	.....	1,700	3+0—	1+2—	0+3—
Dec. 3	Tap, City Hall	.....	400	3+0—	1+2—	0+3—
.....	Filtered water	4.9	55	1+2	0+3	0+3
Nov. 7	Raw water	.....	130	3+0	0+3	0+3
.....	Raw water plus hypo	.....	110	3+0	0+3	0+3
.....	Raw water	6.1	834	2+1—	0+3—	0+3
.....	Chlorinated filter effluent	7.2	60	0+3—	0+3—	0+3
.....	Effluent C. W. well	.....	45	0+3—	0+3—	0+3 —
19	Tap, Menands	.....	70	0+3—	0+3—	0+3—
.....	Raw water	8.3	55	1	2+1	0+1
Nov. 9	Raw water	.....	250	1+1	1+2	0+3
14	Raw water	6.8	61	0+0	0+3	0+1
19	Raw water	6.3	54	0+0	0+3	0+1
23	Raw water	.....	54	0+0	0+3	0+1

REMARKS

Chlorine tank empty at 12 M.; new tank attached in P. M.
Pump out of service 10 A. M.–12. 15 P. M.; 4.45 P. M.–5.30 P. M.
Difficulty in operating pump
Pump broken down
Leak in chlorine apparatus; shut down several hours
Pump and chlorine apparatus out of service most of the time

A tabulated summary of the inspection work carried on by the engineering division in connection with the operation of the chlorine plants, together with the results of analyses of samples of raw and chlorinated water will be found appended. The analytical results show the grossly contaminated condition of the raw waters, especially the Hudson. From the table it will be seen that a large amount of chlorine was required to secure satisfactory sterilization of the Hudson supply, and the notes indicate the difficulties experienced in maintaining satisfactory operation of the chlorination apparatus. It is interesting to note, however, that, in spite of these difficulties and the occasional incomplete disinfection, comparatively few typhoid cases were reported with dates of onset later than October.

WATKINS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the sanitary condition of the public water supply of the village of Watkins made by Mr. C. M. Baker, assistant engineer, on May 29, 1917.

General information

Location.— Schuyler county at south end of Seneca lake on Northern Central railroad, also trolley from Elmira.

Population.— 2,760, of which practically all are served with the water.

Source of supply.— Seneca Lake. Watershed area 150 square miles.

Waterworks controlled by.— Board of water commissioners.

Consumption.— 267,000 gallons daily or about 97 gallons per capita.

Distribution system.— Water is pumped through 10 miles of 4-inch to 12-inch mains into standpipes.

Service taps.— 650, nearly all of which are metered.

Pressure.— 80 pounds in main part of village.

Storage.— Low level, 500,000 gallons; high level, 70,000 gallons.

Purification.— Liquid chlorine sterilization.

Reference to previous investigations.— Page 717, 34th annual report, also reinspection report under date of April 13, 1915.

The previous reports pointed out the possibility of contamination of the supply from the sewage of Watkins itself, which is discharged into the lake about one mile from the water intake and also from various other sources of pollution tributary to Seneca lake. The immediately preceding report, therefore, included the following recommendations:

1. Carry out the requirement of this Department in respect to the submission of plans for sewage treatment.
2. Consider at once the installation at the earliest possible time of a modern filtration plant.
3. Install immediately, pending the construction of the filter plant, apparatus for the sterilization of the supply with hypochlorite of lime or liquid chlorine.

As a result of this investigation it is apparent that only recommendation No. 3, regarding the installation of apparatus for sterilizing the supply, has been carried out although correspondence from the village officials has stated that steps are being taken toward the preparation of plans for a sewage disposal plant as recommended in No. 1.

In the latter part of 1915 and early in 1916 several cases of typhoid fever occurred in the village of Watkins. An investigation by the sanitary supervisor of the district at that time indicated that the source of infection was

the public water supply. Action, therefore, was immediately taken by the village officials toward the installation of apparatus for disinfecting the supply as a result of which a temporary liquid chlorine plant was installed by Wallace & Tiernan Co. in December, 1915. Later in March or April, 1916, a permanent plant was installed.

The chlorine plant consists of a Wallace & Tiernan solution feed apparatus, the chlorine solution being discharged into the suction line of the pumps. Scales are provided for determining the actual amount of chlorine applied as indicated by the loss of weight in the cylinders but no records are kept of the operation of the plant and apparently these scales are little used. A notice, which the engineer in charge of the plant stated was posted by the representative of the company who installed the chlorine plant, read as follows:

> "Don't interfere with Valve S. This valve is set and must not be disturbed for any reason."

Valve S refers to the chlorine control valve and it is apparent from this notice, and such was the understanding of the engineer in charge of the plant, that the rate of applying the chlorine should not be varied. The water is pumped at rates varying from 500,000 to 1,500,000 gallons daily since there are three pumps, each with a capacity of 500,000 gallons, any or all of which may be in service at one time. It is thus apparent that either an excessive amount of chlorine is applied during minimum pumpage or an insufficient amount at times of maximum pumping. According to the statement of the engineer in charge of the plant chlorine is applied at such a rate as to require 25 seconds for each pulsation of the chlorine meter which, according to the chart accompanying the apparatus, corresponds to .88 pound per 24 hours. When one pump is in operation the above figure would be equivalent to a rate of .24 part per million which should be sufficient for satisfactory sterilization under ordinary conditions. This amount would be insufficient, however, when two or more pumps are being operated or when the raw water is turbid or highly polluted.

Apparently the engineer in charge of the plant had not been properly informed regarding its operation since he seemed to have little knowledge regarding the working of the different parts and care of the apparatus and was improperly informed regarding controlling the rates of chlorine application. He stated that considerable trouble had been experienced due to leaks and stoppages in the various parts of the apparatus since its installation and that the instrument had been sent back to the company for repair two or three times since its installation.

Due to a lack of containers samples were not collected at the time of the inspection. Later, however, samples were collected by the local health officer and sent to the Division of Laboratories and Research for analyses the results of which are recorded in the appended table.

The results of these analyses show a higher bacterial content in the treated than in the raw water, also that the B. coli type are practically as prevalent after as before treatment. It is thus evident that insufficient chlorine was being applied at the time of the collection to secure adequate purification and that the treated water was unsafe for potable purposes.

As a result of this investigation it may be concluded:

1. That the previous recommendations of this Department have been partially carried out.
2. That, however, the chlorine apparatus is being inefficiently operated in that,
   (a) The rate of applying the chlorine is not varied with the rate of pumping.
   (b) The operation of the apparatus is not checked by determining the rate of chlorine applied as indicated by the scales.
   (c) Inadequate records are kept regarding the operation of the chlorine plant.
   (d) The results of analyses of samples collected subsequent to the time of inspection showed inefficient sterilization.

In view of the above I beg to offer the following recommendations to be acted upon by the village authorities:

1. As recommended in the previous reports,
   (a) Plans for treatment of the sewage of the village of Watkins be submitted to this Department for approval.
   (b) Consideration be given to the installation of a modern filtration plant.
2. That regarding the operation of the chlorine apparatus:
   (a) The rate of applying the chlorine be varied with the rate of pumping in such a manner that not less than .26 part per million of chlorine be applied at all times.
   (b) That the operation of the apparatus be checked by the amount of chlorine applied as indicated by the weighing scales.
   (c) That records be kept regarding the operation of the apparatus, showing the amount of chlorine applied as indicated by the chlorine meter and also as indicated by the weighing scales, the times at which the new cylinders are connected with the apparatus, the amount of water pumped and any troubles or difficulties in connection with the operation of the plant.

Finally I would recommend that copies of this report be sent to the local health officer and other village officials and also to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 3, 1917

REPORT OF WATER ANALYSES FOR WATKINS

Source		Raw water Seneca lake	Tap at pump station, treated	Tap in center of village, treated
Collected on		6/13/17	6/13/17	6/13/17
Color		.....	.....	0
Odor, hot		.....	.....	0
Odor, cold		.....	.....	0
Turbidity		.....	.....	0
Ammonia, free		.....	.....	.006
Ammonia, albuminoid		.....	.....	.062
Nitrites		.....	.....	0
Nitrates		.....	.....	.40
Oxygen consumed		.....	.....	2.90
Chlorine		.....	.....	65.00
Hardness, total		.....	.....	105.8
Alkalinity		.....	.....	106.0
Bacteria per c.c.		2,850	12,500	31,500
B. coli type	10 c.c.	3+0—	3+0—	3+0—
	1 c.c.	2+1—	3+0—	0+3—
	1/10 c.c.	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

WAYLAND

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of Wayland, made by Mr. C. M. Baker, assistant engineer, on September 7, 1917.

Wayland is an incorporated village of 1,700 inhabitants, located in the northwestern corner of Steuben county on the D., L. & W. railroad, the Rochester branch of the Erie railroad and the Pittsburgh, Shawmut and Northern railroad, about 43 miles south of Rochester. No sewer system is provided in the village, the houses being served by privies, cesspools, etc.

The water supply is owned by the municipality and controlled by the board of trustees. It was first installed and put into operation in 1903. Since the original installation the only additions have consisted in extensions to the distribution system. The supply is derived from a well located in the northern part of the village from which the water is pumped through the distribution system into a storage reservoir located on a hill just northeast of the village. The distribution system consists of about 7 miles of mains ranging from 4 inches to 8 inches in diameter. About two-thirds of the inhabitants of the village are served with the water, there being in all 356 service taps, 218 of which are metered. The consumption averages approximately 100,000 gallons daily or 88 gallons per capita. The pressure is approximately 92 pounds per square inch.

The pumping equipment is located in the electric lighting plant and consists of one triplex double acting Gould pump with a capacity of 300 gallons per minute. The storage reservoir is constructed of concrete and is 70 feet in diameter by 10 feet deep, its capacity being about 300,000 gallons. It is uncovered.

The well from which the supply is obtained is located near the Erie railroad, in the northwest corner of the village. It is 25 feet deep by 10 feet in diameter, and is curbed with fire brick laid in cement mortar. The outside of the curb is banked with earth to divert surface wash. The well is covered with a wooden roof. In the bottom of this well 24 pipes are driven to depths ranging from 8 to 15 feet. The water rises in the well to within 15 to 18 feet of the surface and during the pumping the elevation of the water is lowered about 1½ feet. The strata through which the well is dug and driven consist of 10 feet of gravel, 5 feet of clay, then a water-bearing gravel stratum from which the supply is obtained. Inquiry regarding other wells in the village indicated that the clay strata are practically continuous throughout the village.

A cesspool is located about 95 feet southwest of the well and 2 privies at a distance of about 200 feet in the same direction. The electric-lighting plant is about 16 feet distant and a feed mill about 50 feet. Across the track to the northeast is a silk mill which discharges its sewage into nearby settling tanks and cesspools, one being located about 250 feet, another 300 and another 400 feet from the well. There are about 150 employees in this institution. Within 100 feet of the well there are 3 buildings, 100 to 500 feet, 6 buildings, 500 to 1,000 feet, 15 buildings. Although the well is satisfactorily protected from surface wash the insanitary conditions described above undoubtedly cause considerable pollution of the ground water in the vicinity. While the clay strata may largely prevent this polluted water from finding its way into the supply, it is probable that under certain hydrostatic conditions of the ground water pollution at times finds its way into the supply, either by passing through openings of the clay strata to the ground water tributary to the well or by infiltration along the curb of the well.

Containers were not available for the collection of samples at the time of the inspection. Samples were later collected by Dr. Peabody, health officer, however, and sent to the Division of Laboratories and Research for analyses, the results of which together with those of previous analyses are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but a water high in hardness. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low, but those for nitrates and chlorine are high. The bacterial counts are low, except in a few cases, and colon bacilli have been found present only in the 10 c.c. inoculations of one of the 11 samples analyzed. The high bacterial counts may be due, in part at least, to delay in transit, since several days elapsed from the time the recent samples were collected until they were received at the laboratory. The high nitrates and chlorine indicate that pollution finds its way into the ground water tributary to the supply, but the absence of colon bacilli indicate that this pollution has been rendered inactive by the natural processes of purification. That this purification will continue effective at all times, however, is very improbable, since the accumulation of pollution in the soil and the increased ground water flow at times of excessive pumping or during certain seasons of the year, tend to decrease the efficiency of this purification.

As a result of this investigation it may be concluded that although past analyses have failed to indicate the presence of any appreciable amount of active contamination, the public water supply of Wayland is derived from a well unsatisfactorily located in that there are numerous insanitary conditions in the vicinity which are potential sources of pollution for the supply.

In view of the possibility of contamination of the supply in the future as pointed out above, I beg to offer the following recommendations to be acted upon by the village officials:

1. That the source of pollution in the vicinity of the well be removed:
   (a) By the construction of a sewer system to adequately care for the sewage of the village, those sewers in the immediate vicinity of the well being constructed of cast iron with watertight joints, and
   (b) Pending the completion of the sewer system, by providing all privies and cesspools within a radius of 500 feet of the well with watertight containers and properly disposing of their contents at regular intervals.
2. That regular analyses of the water be occasionally made during the year to detect the presence of any active contamination which may occur.
3. That should such contamination be at any time found present, steps be immediately taken,
   (a) To determine and eliminate the sources of pollution, or,
   (b) If this seems impossible or impracticable, to provide purification of the water by sterilization with liquid chlorine or other equivalent method.
   (c) Should the above improvements fail to render the supply satisfactory or seem impracticable, a new supply free from all sources of pollution should be developed.

Finally, I would recommend that copies of this report be sent to the various local officials and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 20, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT − = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Wayland	Steuben	Tap, public supply	1/ 6/12	Tr.	Cl.			161		129	.010	.018	Tr.	2.00	0.10	3.00	111.4	106.0	45	−	−	−
Wayland	Steuben	Tap, public supply	2/15/12	Tr.	Cl.			187		144	.024	.022	Tr.	2.40	0.70	5.00	125.8	115.0	30	−	−	−
Wayland	Steuben	Tap, public supply	3/23/12	Tr.	Cl.			169		148	.006	.024	Tr.	2.60	0.40	4.25	108.6	103.0	110	−	−	−
Wayland	Steuben	Tap, public supply	10/ 3/12	5	Cl.			202		158	.004	.012	.001	0.50	0.10	3.25	128.6	123.0	70	−	−	−
Wayland	Steuben	Tap, public supply	11/25/12	Tr.	Cl.			192		160	.010	.024	.001	2.00	0.20	3.25	140.0	125.0	900	−	−	−
Wayland	Steuben	Tap, public supply	1/ 3/13	Tr.	Cl.			184			.024	.040	.001	3.20	0.50	3.50	148.6	119.0	70	−	−	−
Wayland	Steuben	Tap, public supply	3/14/13	Tr.	Cl.			150			.010	.012	Tr.	2.40	0.20	2.25	93.6	87.0	1,900	−	−	−
Wayland	Steuben	Tap, public supply	5/ 1/13	Tr.	Cl.			165			.010	.016	Tr.	1.00	0.20	3.00	117.2	87.0	70	+	−	−
Wayland	Steuben	Tap, public supply	6/11/13	Tr.	Cl.			148			.004	.010	Tr.	1.00	0.20	1.25	103.6	93.0	170	−	−	−
Wayland	Steuben	Tap, pumping station*	9/22/17																850	0+3−	0+3−	0+3−
Wayland	Steuben	Tap in village*	9/22/17	0	0	1 v.	2 v.				.002	.048		1.60	0.30	5.00	151.4	147.0	5,300	0+3−	0+3−	0+3−

* Samples several days in transit.

WELLS BRIDGE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon the investigation of the public water supply of Wells Bridge, made by Mr. M. F. Sanborn, assistant engineer, on August 28, 1917.

Wells Bridge is an unincorporated village, located in the southern part of Otsego county, on the Susquehanna river, and on the D. & H. R. R., about 13 miles southwest of Oneonta. The population is estimated at 120. About two-thirds of the houses are provided with private sewers, which discharge into the river, while the remaining houses are served by cesspools and privies.

The water supply is owned and operated by the Wells Bridge Water Works Company. The supply is derived by gravity from a spring one mile northwest from the village. An auxiliary supply has been obtained for short periods from a well located near the railroad. The waterworks were installed and put in operation in 1914.

Approximately 90 per cent of the population is served with the supply through 130 service taps, none of which are metered. There are 1½ miles of water mains, ranging in size from 1 to 3 inches in diameter. The average pressure is 55 pounds per square inch. Fire protection is provided by means of 8 hydrants, located at various points in the village.

The spring from which the supply is obtained is located in a wooded tract on a side hill, one mile north of the village. The spring is developed by the construction of a circular masonry pit or basin, 3 feet in diameter and 2 feet deep and covered by loosely laid plank. From this spring a 1-inch pipe, the top of which is covered with a copper screen, conveys the water to the distributing reservoir, located in the northern part of the village. This reservoir is constructed with concrete walls and bottom, 22 feet in diameter, 12 feet deep and with a capacity of 34,000 gallons. The top of the reservoir is covered by a conical shingle roof. The reservoir is cleaned once a year and the water mains are flushed 2 and 3 times a year.

There were no permanent sources of contamination located in the vicinity of the spring, but its development is such that there is a possibility of surface wash reaching it directly at times of heavy rainfall, and furthermore, the character of the cover renders possible opportunities for accidental or wilful contamination by visitors in its vicinity.

The auxiliary well, from which the supply may be augmented at times, consists of 6-inch casing driven to a depth of 60 feet through quicksand. It is located near the railroad tracks, but no other sources of contamination are within 100 feet of it. From 100 feet to within 500 feet there are some 8 buildings, provided with privies and a private sewer passes along the street about 60 feet distant.

At the time of the inspection a sample of the spring supply was collected from a tap in the village. No samples, however, were taken from the well supply, as it was not in use at the time. The results of the analysis of the sample collected made by the Division of Laboratories and Research may be found in the appended table.

The results of this analysis show a clear and colorless water of comparative softness. The figures for nitrogen in its various forms and for oxygen consumed are low. The total bacterial count is somewhat high and the occurrence of organisms of the B. coli type in inoculations as small as 1 c.c. indicates the presence of active contamination.

In view of the above facts the following conclusions may be drawn:

1. That the regular water supply of the village of Wells Bridge is derived from a source which if more satisfactorily developed and protected should afford a supply of satisfactory sanitary quality.

2. That the auxiliary well used at times to supplement the regular supply is somewhat unsatisfactorily located with respect to its proximity to sources of possible pollution of the ground water tributary to it.

I would therefore make the following recommendations to be acted upon by the waterworks company:

1. That steps be taken to more satisfactorily develop the spring from which the supply is obtained by the construction of a masonry or concrete curb around its top extending at least 1 foot above the surface of the ground and providing the basin thus formed with a tight cover which should be kept locked.

2. That, in order to avoid the necessity for the use of the auxiliary well, other springs satisfactorily located and free from possibilities of contamination be developed and connected with the present reservoir.

I would further recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 15, 1917

REPORT OF WATER ANALYSIS FOR WELLS BRIDGE

Source		Tap in village
Collected on		8/28/17
Color		0
Odor, hot		0
Odor, cold		0
Turbidity		0
Ammonia, free		.002
Ammonia, albuminoid		.016
Nitrites		absent
Nitrates		.02
Oxygen consumed		.5
Chlorine		1.25
Hardness, total		27.3
Alkalinity		23.0
Bacteria per c.c.		110
B. coli type	10 c.c.	3+0—
	1 c.c.	3+0—
	1/10 c.c.	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

WELLSVILLE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the public water supply of the village of Wellsville made on April 6, 1917, by Mr. E. S. Chase, assistant engineer.

Wellsville is an incorporated village with a population of 4,382 located in the southeastern part of Allegany county on the Genesee river and on the Erie and Buffalo and Susquehanna railroads. The village is partly an industrial community and partly a trading center for the surrounding agricultural region. While there is no comprehensive sewer system for the entire village, several private and public sewers empty into the river while many houses are served by privies and cesspools.

The public water supply is derived from the Genesee river after purification through a slow sand filter plant. The supply was formerly owned by the Wellsville Water Company and derived unpurified from Cromer brook and from wells near the Genesee river. This original supply proved inadequate in quantity and not satisfactory in quality and consequently the village took

steps to purchase the plant of the company and to develop a new supply from the Genesee river. This new supply has been in operation since the twenty-seventh of January of the present year. The waterworks were designed by Mr. C. C. Hopkins, civil engineer of Rochester, and installed by contract under the direction of Mr. J. M. Sill, resident engineer.

Practically the entire population of the village is served by the supply and the average daily consumption may be estimated at approximately 550,000 gallons. There are about 6 mills and the railroad which use considerable amounts of water. There are 18 miles of water mains ranging in size from 5 to 14 inches in diameter. Of the 1,000 service taps some two-thirds are metered at present and meters are being installed on the other services as rapidly as possible. The water is pumped from the river to the filtration plant located on a hill north of the village, from whence it is distributed by gravity at an average pressure of about 90 pounds per square inch.

The intake is located about 1 mile south of the village at a point just above an oil refinery. At this point a low timber dam has been placed across the stream and concrete intake works constructed on the east bank. From this intake the water flows by gravity to the pumping station located in the southwestern part of the village on the western bank of the river.

The pumping equipment consists of a two-stage Allis-Chalmers centrifugal pump direct connected to an electric motor. The capacity of this pump is 1,260 gallons per minute. Two old Worthington duplex steam pumps rated at 1½ million gallons per day each are kept in reserve for emergency. Steam and electricity are furnished by the power plant of the municipal electric works located in the same building.

From the pumping station the water is forced to a 3,000,000-gallon storage reservoir constructed of concrete and circular in plan. From this reservoir the water flows by gravity to three units of covered slow sand filters 40 x 93 feet in plan each, with a total area of one-fourth acre. The sand in these filters is 30 inches in depth over 5 inches of graded gravel underlaid by brick underdrains. The water is carried over the sand layer of the filters at a depth of 3 feet. Devices are provided for indicating the loss of head through the filters and for controlling the rate of filtration. It is planned to clean the filters at such times as the loss of head reaches 3 feet. After cleaning it is planned to waste the filtrate for about three days to an amount of 150,000 gallons. From the filters the purified water flows to a circular covered reinforced concrete clear water basin with a capacity of half a million gallons 75 feet diameter and 15 feet deep.

Analyses of raw and treated water are made at intervals by Mr. G. E. Willcomb of Albany and every week by Dr. Robinson of the Allegany county laboratory.

The Genesee river above the point of intake has a watershed area of approximately 200 square miles and a population estimated at 20 per square mile. This area is devoted largely to agriculture and the opportunities for pollution are those incidental to any fairly well populated surface watershed. A portion of the watershed lies in the state of Pennsylvania and on this portion is located the village of Genesee. This village has no sewerage system, however.

Subsequent to this inspection a request has been received from the village authorities for the enactment by this Department of rules and regulations for the sanitary protection of that portion of the Genesee river tributary to their supply and located within this State.

On February 28 of the present year the water from one of the old wells near the pumping station was pumped directly into the distribution system. After this pumping many cases of diarrheal disturbances occurred in the village which were attributed to the use of this well water. These wells are located in coarse gravel within a few feet of the Genesee river and the water therefrom undoubtedly reaches these wells without adequate purification at times of heavy draft. A by-pass is also provided into the distribution system from the force main to the purification plant whereby untreated river water may be pumped into the distribution system at times of fire or other emergency.

At the time of the inspection samples of the raw and untreated water were collected and the results of these analyses together with others made in the past by the Division of Laboratories and Research will be found in the appended table.

These analyses show clearly the contaminated condition and unsafe sanitary quality of the raw Genesee river water, the total bacterial counts being high and organisms of the B. coli type prevalent. The results of these analyses of the filtered water show a marked reduction in the total counts and in organisms of the B. coli type, although it is probable that still further bacterial removal will be effected as soon as the filters have had opportunity to reach normal operating condition.

In view of the above facts, the following conclusions may be drawn:

1. That the new filtration works for the public water supply of the village of Wellsville appear to be so designed and constructed as to afford opportunity for ample purification of the Genesee river provided these works are at all times carefully and efficiently operated.

2. That at the time of the inspection the filters had been in operation too short a time to have reached the point of highest bacterial efficiency, but there is no reason to believe that satisfactory efficiency will not be reached shortly.

3. That the pumping of raw river water or water from the old wells directly into the distribution system without purification is inadvisable and might result in an outbreak of water-borne disease. In this connection the outbreak of intestinal disturbances subsequent to the use of the unpurified well water is extremely significant.

4. That the existence of the by-pass valve connecting the raw water force main directly with the distribution system renders it possible to nullify the good effect of the purification plant at such times as direct pumping is resorted to.

I would therefore recommend:

1. That the village authorities continue to maintain careful and efficient operation of the purification plant and keep proper records of such operation and the results of the analyses made at regular intervals.

2. That at no time should raw water from either wells or river be pumped directly into the distribution system.

3. That the by-pass valve connecting the force main and distribution system be kept sealed and tightly closed except in case of a severe fire and subsequent to the use of raw water at such a time the mains be thoroughly flushed. Furthermore, steps should be taken to provide at the earliest practicable time ample reserve storage of purified water to fulfill all requirements for fire protection in order that this valve and cross connection may be completely removed.

4. That upon enactment the rules and regulations of this Department covering that portion of the Genesee river immediately tributary to the Wellsville water supply and situated in this State be thoroughly enforced by the local authorities.

I would also recommend that copies of this report be transmitted to the local authorities and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *May* 25, 1917

REPORT OF WATER ANANYSES FOR WELLSVILLE, ALLEGANY CO.

Source	Genesee river, raw water	Filtered water	Raw water	Filtered water at filters	Tap, near filters	Tap, railroad station
Collected on	3/12/17	3/12/17	4/6/17	4/6/17	4/6/17	4/6/17
Color	.....	15	10	.....	15	.....
Odor, hot	.....	1 e.	1 v.	.....	1 v.	.....
Odor, cold	.....	1 v.	1 v.	.....	1 v.	.....
Turbidity	.....	5	3	.....	12	.....
Ammonia, free	.....	.070	.032	.....	.040	.....
Ammonia, albuminoid	.....	.134	.068	.....	.082	.....
Nitrites	.....	.003	.002	.....	.004	.....
Nitrates	.....	0.70	tr.	.....	.020	.....
Oxygen consumed	.....	2.00	2.20	.....	3.90	.....
Chlorine	.....	4.75	3.50	.....	3.50	.....
Hardness, total	.....	24.7	31.2	.....	39.0	.....
Alkalinity	.....	22.0	18.0	.....	34.0	.....
Bacteria per c.c.	3,700	325	450	45	30	40
B. coli type... 10 c.c.	3+0—	1+2—	3+0—	1+2—	2+1—	2+1—
B. coli type... 1 c.c.	2+1—	0+3—	1+2—	0+3—	0+3—	0+3—
B. coli type... 1/10 c.c.	1+2—	0+3—	1+2—	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

WEST WINFIELD

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of West Winfield, made by Mr. C. M. Baker, assistant engineer, on April 10, 1917.

West Winfield is an incorporated village of 788 inhabitants, located 18 miles south of Utica, in the extreme southwestern corner of Herkimer county, on the Unadilla river and the Richfield Springs branch of the D., L. & W. railroad. A drainage system is provided in the village for carrying off surface wash, which also receives wash water from sinks, etc., although it is claimed that no toilets are connected with this system. Excretal wastes are disposed of by means of privies and cesspools.

The water system was originally installed and put in operation some 35 or 40 years ago. It was originally owned by a private concern and derived from springs. Later a group of wells were added and finally the well from which the present supply is derived was developed. In 1915 the supply was taken over by the municipality. The water is now obtained from a well located in the northeastern part of the village, whence it is pumped through the distribution system into a storage reservoir. Seventy-five or 80 per cent of the population is served with the water, there being in all 170 service taps, only 3 or 4 of which are metered. The distribution system consists of approximately 4 miles of mains ranging in size from 4 to 10 inches in diameter. From the pump records the consumption averages about 72,000 gallons daily, an equivalent of 118 gallons per capita. During the winter the consumption is greater than in the summer. The pressure in the village averages from 80 to 95 pounds per square inch.

The pumping equipment consists of 2 Gould pumps, each with a capacity of 100 gallons per minute, one being operated by a 15 horsepower oil engine and the other by a 50 horsepower gasoline engine. The reservoir, which is uncovered, is 20 feet deep by 50 feet in diameter and has a capacity of approximately 118,000 gallons.

The Hiteman Leather Company obtains an auxiliary fire supply from the Unadilla river and their system is connected with the village distribution system, thus making it possible to pump from the river into the village

mains. No check valve is provided in the system of the leather company to prevent water from their pump entering the village system at any time when the pump is in operation. Gate valves are provided, however, which are said to be kept closed at times when the company's pump is in operation.

The well from which the village supply is derived is 6 inches in diameter by 30 feet deep. The strata through which it is drilled consist of 6 or 7 feet of gravel, 10 or 12 feet of clay hardpan, the remainder being through a water-bearing gravel stratum, which is the source of the supply. This well is located on the bank of North Winfield creek at the foot of a steep slope. It is close to the water's edge and at the time of the inspection the water of the creek was only 1 or 1½ feet below the level of the floor of the pumping station, which is located directly over the well. It is probable that the area about the pumping station, and possibly the floor of the plant itself, are inundated at times of high water. North Winfield creek drains several square miles of farm land and is subject to considerable pollution from numerous houses on the watershed. A privy at the pumping station is located about 130 feet from the well. On the hill above the well within a radius of 500 feet are about 5 houses and beyond this distance and within 1,000 feet there are probably 7 houses.

The results of analyses of samples of water collected prior and subsequent to the inspection are recorded in the appended table.

The results of these analyses show a water satisfactory in physical qualities with respect to color and turbidity but one that is very hard. The figures for nitrogen in the form of free and albuminoid ammonia and nitrites are low, those for nitrates and chlorine, however, are somewhat high, thus indicating that pollution finds its way into the ground water tributary to the supply. The bacterial counts are high for a ground water although colon bacilli were not found present in the inoculations tested.

As a result of this investigation it may be concluded:

1. That the public water supply of West Winfield is derived from a well which may be subject to pollution by the infiltration of creek water at times of flooding of the adjacent area.
2. That the supply may at times be locally contaminated by polluted water pumped into the system from the fire supply of the Hiteman Leather Company.

In view of the above I beg to offer the following recommendations, to be acted upon by the village authorities:

1. That the area in the vicinity of the well be filled in with clean material and properly protected by suitable dikes in order to prevent flooding of this area at times of high water.
2. That the connection between the village supply and the fire supply of the Hiteman Leather Company be removed as soon as practical.

Finally, I would recommend that copies of this report be sent to the local health officer, to the sanitary supervisor of the district and to the board of water commissioners of West Winfield.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 8, 1917

REPORT OF WATER ANALYSES FOR WEST WINFIELD

Source	Tap, public supply	Tap, public supply
Collected on	5/19/16	5/17/17
Color	tr.	0
Odor, hot	2 v.	0
Odor, cold	2 v.	0
Turbidity	cl.	tr.
Ammonia, free	.004	.008
Ammonia, albuminoid	.018	.001
Nitrites	tr.	.001
Nitrates	1.28	.60
Oxygen consumed	0.40	.80
Chlorine	1.50	2.25
Hardness, total	188.5	180
Alkalinity	182.0	178
Bacteria per c.c	375	600
B. coli type 10 c.c.	—	0+3—
B. coli type 1 c.c.	—	0+3—
B. coli type 1/10 c.c.	—	0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetabel.

WHITEHALL

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I beg to submit the following report upon an inspection of the operation of the chlorination plant for sterilization of the public water supply of Whitehall, made by Mr. E. S. Chase, assistant engineer, on December 19, 1916.

Previous investigations have been made of this supply at various times in the past, reference to which will be found in a report made early in 1916. Recently a letter was received from Dr. John S. Guinan, health officer, stating that analyses of the village supply made by the laboratory department of the Borden Milk Company indicated the presence of contamination and accordingly the local milk station had abandoned the public supply. The recent inspection was accordingly made to determine the conditions of operation of the sterilization plant.

The engineer made his visit unannounced and collected samples from a tap in the village before the pumping station was visited. When the station was visited the chlorine apparatus was found to be in operation and applying chlorine at the rate of 3.4 pounds per day. The amount of chlorine being applied may, therefore, be estimated at approximately .62 parts per million. Later in the day the rate of chlorine application was noted to be somewhat less.

The application of chlorine is checked by daily weighings of the chlorine cylinder by the water-works engineer and by weekly weighings made by the superintendent of the water works.

The following table gives the records for this year, as obtained from Miss Rice, village clerk:

TABLE 1

WATER CONSUMPTION AND RATE OF CHLORINE APPLICATION WHITEHALL, 1916

WEEK ENDING	WATER PUMPED		CHLORINE APPLIED			
	Total	Gallons per 24 hours	Total pounds	Pounds per day	Parts per million	Days reservoir in use
1916						
Feb. 14	1,602,000	535,000	4	1.33	.30	4
Feb. 21	3,601,000	515,000	12	1.71	.40	.....
Feb. 28	2,280,000	570,000	7½	1.87	.39	3
Mar. 6	2,943,000	590,000	8	1.60	.32	2
Mar. 13	4,078,000	585,000	14	2.00	.41	.....
Mar. 20	3,299,000	550,000	13	2.16	.47	1
Mar. 27	2,834,000	405,000	8	1.14	.33	.....
April 3	3,142,000	450,000	11	1.57	.41	.....
April 10	Reservoir used	.....	.....	.....	.....	.....
April 17	Reservoir used	.....	.....	.....	.....	.....
April 24	3,640,000	520,000	9	1.29	.30	.....
May 1	2,217,000	443,000	8½	1.70	.46	2
May 8	2,816,000	563,000	8½	1.70	.36	2
May 15	1,881,000	470,000	3	0.75	.19	3
May 22	3,393,000	.....	*	.....	.....	.....
May 29	1,558,000	510,000	3	1.00	.23	4
June 5	3,473,000	495,000	9	1.29	.31	.....
June 12	3,479,000	496,000	9	1.29	.31	.....
June 19	4,220,000	470,000	12	1.33	.34	5
June 26						
July 3	3,612,000	515,000	10	1.43	.33	.....
July 10	2,277,000	455,000	11	2.20	.58	2
July 17	3,632,000	520,000	14	2.00	.46	.....
July 24	4,909,000	700,000	13	1.86	.32	.....
July 31	4,219,000	602,000	14	2.00	.33	.....
Aug. 7	4,114,000	587,000	12	1.72	.35	.....
Aug. 14	4,057,000	580,000	13	1.86	.38	.....
Aug. 21	4,067,000	581,000	16	2.28	.47	.....
Aug. 28	5,486,000	785,000	14	2.00	.30	.....
Sept. 4	3,375,000	482,000	14	2.00	.49	.....
Sept. 11	3,625,000	521,000	13	1.86	.43	.....
Sept. 18	3,600,000	515,000	14	2.00	.46	.....
Sept. 25	3,848,000	550,000	14	2.00	.43	.....
Oct. 2	2,890,000	412,000	11	1.57	.45	.....
Oct. 9	3,220,000	460,000	14	2.00	.52	.....
Oct. 16	3,279,000	468,000	12	1.72	.44	.....
Oct. 23	2,776,000	396,000	11	1.57	.47	.....
Oct. 30	2,616,000	374,000	8	1.14	.36	.....
Nov. 6	2,914,000	420,000	10	1.43	.41	.....
Nov. 13	2,887,000	412,000	12	1.71	.49	.....
Nov. 20	3,227,000	461,000	11	1.57	.41	.....
Nov. 27						
Dec. 4	9,551,000	455,000	30	1.43	.37	.....
Dec. 11						
Dec. 18	2,937,000	420,000	11	1.57	.45	.....

*Apparatus out of order.

Analyses are made frequently by Mr. G. E. Wilcomb, sanitary engineer, the results of which will be found in the following table. At those times, when the analyses indicated incomplete sterilization, Mr. Wilcomb advised increases in the amount of chlorine applied.

TABLE 2

RESULTS OF ANALYSES MADE BY G. E. WILCOMB IN 1916 TREATED WATER, WHITEHALL

DATE	Rate of application of chlorine pounds per day	Count on agar	PRESUMPTIVE B. COLI	
			10 c.c.	1 c.c.
1916				
January 15	1½	2	—	—
January 28	.....	1	—	—
February 22	2	1	+	—
February 29	2	3	—	—
March 15	2	1	—	—
March 28	2	20	+	—
April 18	1½	21	—	—
May 1	1½	1	—	—
May 20	1	8	—	—
June 21	1	110	+	+
June 28	1½	9	—	—
July 19	1½	13	—	—
July 31	1½	55	+	—
August 14	2	6	—	—
August 30	2	18	—	—
September 18	2	60	+	—
October 2	2	30	+	+
October 27	.....	2	—	—
November 21	2	4	—	—
December 12	2	100	+	+

At the time of the recent inspection samples were collected and the results of the analyses of these samples made by the Division of Laboratories and Research will be found in the appended table. These results show satisfactory sterilization at the time of the inspection.

During the past year some 20 analyses of the treated water have been made by Mr. Wilcomb and indications of B. coli in 10 c.c. have been shown in 30 per cent of these samples and in 1 c.c. inoculations in 15 per cent of the samples. Since the installation of the plant 14 analyses of the treated water have been made by this Department, and of these B. coli have been found present in 14 per cent of the 10 c.c. inoculations and in 7 per cent of the 1 c.c. inoculations.

It is evident from these results that at times incomplete sterilization has been obtained, due either to application of insufficient quantities of chlorine or to intermittent operation of the sterilization plant.

As a result of this and past investigations it may be concluded:

1. That the raw water supply of Whitehall derived from the Mettawee river is seriously polluted and at times infected by intermittent and direct discharge of sewage from hamlets and villages located above the intake.

2. That the installation of the sterilization plant has offered a very valuable safeguard to the sanitary quality of the supply although, due to the somewhat variable quality of the raw water and its extremely turbid conditions at times, it is evident that the fullest safeguard can be obtained only by the installation of a complete and modern filtration plant with the chlorination continued as a supplementary method of treatment.

3. That the operation of the chlorination plant, from available records, seems to have been carried out with a fair degree of carefulness, although at times there have been interruptions in the operation due to the appa-

ratus getting out of order and at other times the amount of chlorine applied has been apparently insufficient to bring about satisfactory sterilization.

I would therefore recommend:

1. That the village continue to exercise the most careful and thorough operation of the chlorine apparatus under constant supervision.

2. That in order to prevent the necessity of placing the apparatus out of commission for repairs, the village install a duplicate apparatus or secure sufficient duplicate parts to provide for instantaneous repairs to the apparatus as now installed.

3. That in order to secure an additional safeguard of the sanitary quality and also to secure a supply of a more satisfactory physical quality, the village consider the installation of a modern filtration plant or the securing of a new supply of unquestionable purity, possibly by the development of a gravity supply from upland sources, as soon as the village finances will permit such a course.

As the carrying out of recommendation No. 3 involves numerous engineering and economic problems, it is suggested that before action is taken in this matter, the village authorities secure the advice of a competent water supply engineer.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 16, 1917

TABLE 3

REPORT OF WATER ANALYSES FOR WHITEHALL

Source	Raw water Mettawee river	Engineer's residence	Treated Wilsey farm	Water Manville's drug store
Collected on	12/19/16	12/19/16	.....	.....
Color	.....	5	.....	.....
Odor, hot	.....	1 v.	.....	.....
Odor, cold	.....	1 v.	.....	.....
Turbidity	.....	tr.	.....	.....
Ammonia, free	.....	.016	.....	.....
Ammonia, albuminoid	.....	.044	.....	.....
Nitrites	.....	.001	.....	.....
Nitrates	.....	0.24	.....	.....
Oxygen consumed	.....	2.30	.....	.....
Chlorine	.....	2.25	.....	.....
Hardness, total	.....	87.1	.....	.....
Alkalinity	.....	80.0	.....	.....
Bacteria per c.c.	500	30	40	10
B. coli type, 10 c.c.	3+0—	0+3—	0+3—	0+3—
B. coli type, 1 c.c.	3+0—	0+3—	0+3—	0+3—
B. coli type, 1/10 c.c.	1+2—	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

WHITEHALL

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on a reinspection of the chlorination plant operated in connection with the public water supply of the village of Whitehall, Washington county, N. Y., made by Mr. Henry Ryon, inspecting engineer in this Department, on November 9, 1917:

General information

Location.— Whitehall is located in the central northern part of Washington county. It is on the D. & H. railroad, about 78 miles north of Albany.

Population.— About 4,700. Nearly all of the houses in the village are connected with the public water supply.

Source of supply.— Mettawee river. The intake is located about 1½ miles above the center of the village.

Consumption.— About 500,000 gallons per day or 110 gallons per capita per day.

Distribution system.— The water is pumped directly into the village mains, the surplus going to a storage reservoir.

Storage.— The capacity of the storage reservoir is 5,000,000 gallons.

Purification.— Sterilization by liquid chlorine.

Records of previous references.— Investigations of typhoid outbreaks in Whitehall were made by this Department in 1904–1906 and 1907. The results of these investigations are covered by reports published in the 27th Annual Report of this Department, beginning on page 263, and in volume 2 of the 28th Annual Report, beginning on page 388. In February, 1915, an engineer from this Department was detailed to Whitehall to inspect the conditions and make arrangements for the installation of a chlorinating plant. A report covering the results of this investigation will be found on page 697 of the 36th Annual Report. On August 16 of the same year the chlorination plant was inspected and a report covering the matter will be found on page 708 of the 36th Annual Report. Other inspections of the chlorination plant were made on February 15, 1916, and December 19, 1916. Reports covering the results of these reinspections were submitted to you under dates of April 13, 1916, and January 16, 1917. In the last of these reports it is recommended that the village authorities exercise the most careful supervision over the operation of the plant; that they install duplicate apparatus or secure sufficient duplicate parts to provide for making instantaneous repairs to the apparatus as now installed; and that they consider the installation of a modern filter plant or the development of a new water supply of unquestionable purity. The village authorities have evidently endeavored to carry out the two recommendations first mentioned, but owing to the large expenditure which would be required to carry out the last recommendation, no steps have yet been taken toward the installation of a filter plant or the development of a new source of supply.

The water supply of the village is taken from the Mettawee river immediately adjacent to the pumping station, which is located on the west bank of the river, about 1½ miles upstream from the center of the village. At the time of the inspection the water of the river was almost clear, having a turbidity of only about 10 parts per million, measured by the platinum wire method.

A 24 by 15 direct-acting steam pump is used to force the water into the village mains. This pump is said to be operated continuously except for short periods, when, for making repairs or to avoid taking water that is too turbid, the pump is stopped and the village supply drawn from the storage reservoir. At the time of the inspection the pump was operated at a speed of 18 strokes (complete) per minute, giving a rate of discharge of approximately 475,000 gallons per 24 hours.

The apparatus used for applying chlorine to the water is of the solution feed type, manufactured by Wallace & Tiernan. A scale is provided for weighing the chlorine cylinder. According to the weights recorded in the note book kept by the engineer at the plant, chlorine has been applied to the water at the rate of from 1.8 to 2.0 pounds per day; or, assuming an average of 500,000 gallons per day as the amount of water pumped, from .42 to .48 parts per million.

When the inspector from this Department reached the plant, the pump was running at the speed noted above, but the decidedly unsatisfactory bacterial results of the analysis of a sample of water taken before the apparatus was adjusted. The engineer in charge of the plant explained that the

apparatus then in use was an emergency machine, being used because the regular apparatus had been shipped to the factory for repairs, and that it did not work as well as the regular apparatus. He also stated that the valve on the chlorine cylinder then in use did not work properly. After the machine was adjusted so that the rate of application of chlorine, as estimated from the impulses of the meter connected with the apparatus, was about 0.4 parts per million, the treated water showed an excess of chlorine of 0.11 parts per million whereas no excess was found before the adjustment took place.

Analyses of the treated water are made by G. E. Wilcomb, sanitary engineer, every two weeks, and the results obtained by him indicate that in general the water delivered to the village has been of satisfactory sanitary quality. The bacterial count has been low, and the tests for colon bacilli in 10 c.c. inoculations have usually given negative results. The results, however, of the examination of a sample of water taken by Mr. Wilcomb about November 1, 1917, showed a very high count and indicated bacteria of the colon type in 1 c.c. inoculations. These unsatisfactory results were in all probability due to the failure of the chlorine apparatus to deliver chlorine to the water at a uniform rate. The matter of the uniformity of the application of chlorine is one of vital importance, and should be given proper attention by the village authorities, for, even though the total amount of chlorine applied during 24 hours may be sufficient for the satisfactory treatment of the water, if the apparatus fails to work and the flow of chlorine is stopped or materially reduced for only a few minutes, the results may be quite serious.

Samples of the raw and treated water were taken at the time of the inspection, and the results of the examination of these samples together with the results of the examination of samples taken during 1916, are given in the appended table. These results are in accordance with the conclusions that would naturally be arrived at from the physical examination of the water supply.

The results of the chemical analyses of the water studied in connection with the results of the bacteriological examination of the raw water indicate that the raw water while undoubtedly polluted, is of such a quality as could readily be purified by proper methods. The fact that the sample taken just before the inspector from this Department reached the plant on November 9, 1917, and the sample taken by Mr. Wilcomb about November 1, 1917, both show a high bacterial count and bacteria of the colon type in 1 c.c. show that the present method of treatment cannot always be relied upon unless the operation of the plant is very carefully carried on. A comparison of the results of the bacteriological examination of the samples of treated water taken on November 9, 1917, before the chlorination apparatus was adjusted to feed chlorine into the water at a proper rate with those of the examination of samples of the treated water taken after the adjustment was made, indicates very clearly the importance of careful operation and the necessity of applying chlorine to the water at the proper rate at all times.

As a result of the investigation it may be concluded:

1. That the raw water of the Mettawee river is seriously polluted.

2. That the operation of the chlorinating plant, judging from available records and an examination of the plant, seems, in general, to have been carried on in a satisfactory manner, although at times the apparatus has failed to deliver chlorine at the proper rate.

3. That although the chlorinating plant when operating properly renders the water supply to the village comparatively safe, the variable quality of the water, its extremely turbid condition at times and the frequent failure of the apparatus to work properly, indicate that the only way to assure a supply of unquestionable purity is to install a complete modern filtration plant with the chlorination continued as a supplementary method of treatment.

I would, therefore, recommend:

1. That the village authorities exercise the most careful supervision over the operation of the plant, giving attention to the uniformity of the application of the chlorine as well as to the total quantity applied per day.

2. That the operation of the chlorinating plant, judging from available quality of the water and also to secure a supply of most satisfactory physical quality, the village authorities consider the installation of a modern filtration plant, or the securing of a new supply of unquestionable purity, possibly by the development of a gravity supply from upland sources, as soon as the village finances will permit.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 7, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE + = PRESENT — = ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.; gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Whitehall	Washington	Raw water, Mettawee river	12/19/16	....	....	....	....	....	....	.016	.044	.001	0.24	2.30	2.25	87.1	80.0	.....	500	3+0—	3+0—	1+2—
Whitehall	Washington	Tap, engineer's residence	12/19/16	5	Tr.	1 v.	1 v.	....	....	....	....	....	....	....	....	....	....	.....	30	0+3—	0+3—	0+3—
Whitehall	Washington	Tap, drug store	12/19/16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	10	0+3—	0+3—	0+3—
Whitehall	Washington	Tap, Wilsey farm	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	40	0+3—	0+3—	0+3—
Whitehall	Washington	Raw water, Mettawee river	11/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	600	3+0—	2+1—	0+3—
Whitehall	Washington	Tap on William street before adjustment of chlorine apparatus	11/ 9/17	15	15	2 e.	3 v.	....	....	.016	.052	....	0.50	1.90	2.60	77.1	73.0	.....	275	3+0—	2+1—	0+3—
Whitehall	Washington	Tap, pumping station, after adjustment of chlorine apparatus	11/ 9/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	20	0+3—	0+3—	0+3—

WHITE PLAINS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon a reinvestigation of the public water supply of the city of White Plains. The recent investigation was made on April 26, 1917, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Mr. Miguel L. Hauck, commissioner of public works.

General information

Location.— Westchester county about 15 miles north of New York city on Harlem Division of the New York Central railroad, and New York, New Haven and Hartford Railroad and the Bronx river.

Population.— 22,000, of which about 99 per cent are served by the public water supply.

Waterworks controlled by — Department of public works.

Consumption.— 1,500,000 gallons or about 69 gallons per capita per day.

Source of supply.— Small brook, one set of shallow wells and two sets of deep wells, all in northern part of the city.

Distribution system.— Water pumped to standpipe in northern part of the city and 48¾ miles of mains from 4 to 14 inches in diameter.

Service taps.— 3,400 services, of which nearly all are metered; 450 hydrants.

Pressure.— 85–90 pounds.

Previous investigations of these waterworks were made in 1909 and 1914 and copies of the reports thereon may be found on page 365, vol. 2, of the 1909 Annual Report of this Department, and on page 710, vol. 2, of the 1915 Report, respectively.

In general the waterworks system remains practically the same as in 1914. The 2 reservoirs upon the brook are as described in previous reports, although there are now no buildings upon the watershed above these reservoirs.

The shallow wells are also in about the same condition as described previously. Four are now in use and the two wells west of the main wells are still out of service. The two latter wells are apparently located at natural springs which drain part of the area west and northwest of them. These two wells are probably open to pollution from a cesspool located about 100 feet from and apparently in direct line of ground water flow to the wells. The land surrounding these wells is low and in case water was pumped from them they would undoubtedly receive considerable surface water from the nearby brooks and marsh. The city is soon to construct a sewer through a new street about 150 feet from these two wells and the house near the wells will then be connected to this sewer. If these two wells are to be used again that part of the sewer within 300 feet of the wells should be constructed of castiron and bulkheads constructed in the trench to prevent ground water from passing along the line of the sewer to the ground water reaching the wells. Upon the completion of the sewer the house near the wells should be connected and old cesspool cleaned, disinfected and filled. If a fill of impervious material about 30 feet wide was then placed around each well so as to raise the ground around these wells above high water it is probable that water from these wells might be used during the dry season when the marsh is not flooded.

The 5 deep wells owned by the city are from 80 to 160 feet deep and are located a short distance north of the shallow wells. These deep wells are about 8 inches in diameter and were sunk through various depths of peat, sand and gravel to rock. Not all of these wells are in service, although it is proposed to connect them all for use provided they yield sufficient water.

The other set of deep wells is called the Drew supply. These wells are located about 1 mile northwest of the city wells and are 12 in number, from 6 to 12 inches in diameter and from 85 to 140 feet deep. These wells were

driven through various depths of gravel, hard pan and blue clay to gravel. About 9 of these wells are now in use. The Drew wells are owned by the Castle Heights Water Company, of which Mr. John Drew is president. This company has a contract with the city to furnish 800,000 gallons per day to the city.

The pumping station for the Drew supply is located near the wells and is about 50 feet square. This station contains a 125-horsepower and a 100-horsepower boiler, 1 Worthington duplex compound pump 12 inches by 20 inches by 12 inches by 15 inches, capacity 1,500,000 gallons per day, and 1 Worthington pump 12 inches by 22 inches by 14 inches by 18 inches, capacity 2,000,000 gallons per day.

The pumping station for the city supply is located near the shallow wells and is a frame structure about 60 x 80 feet in plan. The pumping equipment consists of 2 Star water tube boilers 125-horsepower each; 2 Worthington triple expansion duplex pumps 10 inches by 16 inches by 25 inches by 14 inches by 18 inches, capacity 2,000,000 gallons each per day; 1 Worthington duplex compound pump 18½ inches by 12 inches by 10 inches, capacity 1,000,000 gallons; 1 Ingersoll-Rand type 10 air compressor for raising water from the deep wells to the pump well. This pump well is 30 feet in diameter and 25 feet deep.

Practically all of the watershed of the brook above the reservoir is owned by the city, there are no houses upon the watershed, and the only pollution which the water would ordinarily receive would be from persons or animals passing over the shed. The sanitary condition surrounding the wells (except the two westerly dug wells) is good with the exception that very high water on the marsh might cause the ground surrounding some of the wells to be flooded with consequent infiltration of imperfectly purified surface water into the wells. The two westerly dug wells are at present subject to pollution from the nearby cesspool and from surface water. In rear of the city pumping station there is a privy with a concrete vault about 5 feet square and 7 feet deep. The privy is apparently kept in a sanitary condition. No toilet facilities are provided at the Drew pumping station.

About 25 pounds of copper sulphate has been used in each reservoir for the past four or five years to kill a small amount of algae growth which has been found in these reservoirs. This amount corresponds to about .03 to .04 parts per million, a very weak application.

At the time of the inspection samples from a tap in the village and from the various sources were collected and the results of the analyses of these samples will be found in the appended table. For analyses made during the past few years reference is made to the reinspection report of May 17, 1915.

From the analyses of the samples taken at the time of the recent inspection, it will be seen that the water from the tap in the village which is a composite sample of all of the sources, is clear, colorless and quite hard. Nitrogen in its various forms is low and the chlorine is about normal for this section of the country. The bacterial count is moderate and no organisms of the B. coli group were found in the inoculations tested. The results of the analysis of the sample collected from the Drew supply show a water similar, although somewhat harder, to the composite sample. The characteristics of the sample from the city deep wells are about the same as those of the tap water with the exception that the figures for chlorine and hardness are smaller. The bacterial counts are moderate and no organisms of the B. coli type were isolated. The water from the shallow wells is somewhat similar to that of the deep well, except that it is somewhat harder. The bacterial count is fairly high, although no organisms of the B. coli group were found in the samples inoculated. The reservoir water is very soft and slightly colored and turbid. The figures for free ammonia, albuminoid and oxygen consumed are moderately high and are probably derived from vegetable organic matter upon the watershed. The number of bacteria are moderate for a surface supply, and no organisms of the B. coli type were found in the samples inoculated.

As a result of this investigation and of the analyses, the following conclusions may be drawn:

1. That the public water supply of the city of White Plains is apparently of a reasonably satisfactory sanitary quality, as shown by the sanitary survey and by the analyses.

2. That the two westerly shallow wells now out of service are unsatisfactory, because of the location of the nearby cesspool and on account of the possibility of receiving surface water.

3. That there are no toilet facilities at the pumping station of the Drew supply, resulting in the possibility of pollution of the ground in the vicinity of the wells by employees at the station.

In view of the above conclusions, I would make the following recommendations:

1. If it is desired to utilize the two westerly shallow wells after the completion of the sewer and the abandonment, disinfection and filling of the cesspool near them, a bank of impervious material about 30 feet wide should be placed around each of the wells, at least 2 feet above the high water level. With this precaution the water from the wells might be used during the drier period of the year. Analyses of the water, however, should be made before these wells are used, and at frequent intervals while in use, in order to determine its freedom from pollution. It is not thought advisable to use these wells at times when the marsh is flooded on account of the possibility of their receiving surface wash.

2. That a toilet with a removable tight container be installed at the pumping station of the Drew supply, and that the contents thereof be removed at frequent intervals and either burned in an incinerator or under the boiler if buried, at least 500 feet from any of the wells.

In conclusion, I would recommend that copies of this report be transmitted to the local authorities, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *August* 27, 1917

REPORT OF WATER ANALYSES FOR WHITE PLAINS

Source	Tap in village	Drew wells	City deep wells	Shallow wells	Reservoir water
Collected on	4/26/17	4/26/17	4/26/17	4/26/17	4/26/17
Color	Cl.	Cl.	Cl.	Cl.	7.0
Odor, hot	1 a.	1 v.	1 v.	1 v.	1 a.
Odor, cold	1 a.	1 v.	1 v.	1 v.	1 a.
Turbidity	Tr.	Tr.	Tr.	Tr.	4.0
Ammonia, free	0.02	.006	.007	.023	.045
Ammonia, albuminoid	0.045	.007	.014	.01	.156
Nitrites	Tr.	Tr.	Tr.	Tr.	Tr.
Nitrates	0.4	0.7	Tr.	0.3	Tr.
Oxygen consumed	0.6	0.9	0.7	0.3	4.0
Chlorine	6.0	7.0	4.75	4.25	7.0
Hardness, total	140.0	185.4	52.0	88.6	20.8
Alkalinity	103	136	34	82	10
Bacteria per c.c.	50	5	10	130	60
B. coli type, 10 c.c.	0+3—	0+3—	0+3—	0+3—	0+3—
B. coli type, 1 c.c.	0+3—	0+3—	0+3—	0+3—	0+3—
B. coli type, 1/10 c.c.	0+3—	0+3—	0+3—	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

WINTHROP

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an inspection of proposed sources of public water supply for the village of Winthrop made on May 1, 1917, by Mr. M. F. Sanborn, assistant engineer.

Winthrop is an unincorporated village with a population of 450 located in the town of Stockholm in the northeastern part of St. Lawrence county on the Rutland railroad about 35 miles east of the city of Ogdensburg and on the St. Regis river, near the junction of the East and West branches. The village is unprovided with a sewer system, the houses being served by privies and cesspools.

At present the village has no public water supply, water for domestic purposes being obtained from private wells scattered throughout the village. Realizing the need for a public water supply, the citizens of the village selected a committee to investigate the matter of forming a water district, preparatory to the installation of a supply and preliminary plans for such a supply have been prepared by Mr. A. M. Dowd, civil engineer of Winthrop.

It is proposed to develop a supply by pumping water from a driven well, now used in connection with a milk station, into a distribution system to be constructed of ¾ of a mile of 6-inch castiron pipe against pressure to be maintained by an elevated tank which is to have a capacity of 20,000 gallons, and which is to be at an elevation approximately 100 feet above the surface of the ground. It is also proposed to provide an auxiliary intake from the St. Regis river, in order that the supply from the well be augmented at time of fire or other emergency.

The well at the milk station is said to be 6 inches in diameter, driven to a depth of 135 feet. In reaching this depth the well passes through top soil and gravel for 20 feet, and the remainder of the distance through rock, mainly limestone. When the well is not drawn upon, the water of the well is said to rise to a height of 15 or 20 feet above the surface of the ground in the vicinity. The casing of the well is extended to the rock. The pump operated by the milk station is a 4½ by 3¼ by 6-inch plunger pump. In case the village should secure a supply from this well, it has been suggested that the pump be operated by an electric motor.

The well is located not far from the west bank of the St. Regis river. The privy at the milk station is about 90 feet distant from the well, and beyond 100 feet and within 500 feet there are 8 houses, while beyond 500 feet and within 1,000 feet, there are about 12 houses. These houses are served by privies and cesspools.

The St. Regis river above the point of the proposed intake has a watershed area of approximately 875 square miles. Upon this area there are several scattered hamlets and small villages, chief among which is St. Regis Falls, having a poulation of 1,500, located about 25 miles up stream from Winthrop. The total population may be estimated at 7,000, or 8 per square mile. The stream is evidently unsafe for domestic purposes without purification, and is also unsatisfactory from an aesthetic standpoint on account of its high color.

At the time of the inspection samples of water were collected from a tap at the milk station of the well water and from St. Regis river, near the point of the proposed intake, and the results of the analyses of these samples made by the Division of Laboratories and Research will be found in the appended table.

The results of the analysis of the well water show a water clear, colorless and hard. The figures for free ammonia are somewhat high which, however, is usually of comparatively little sanitary significance in deep well water. Otherwise the analytical results indicate the absence of active or past pollution of the ground water tributary to the well. The total bacterial count is low, and organisms of the B. coli type were not found in the inoculations tested.

The results of the analysis of St. Regis river samples show a highly colored and soft water free from turbidity. The figures for free and albuminoid ammonia are moderately high, and that for oxygen consumed high, indicating the presence of considerable amounts of organic matter, mainly of vegetable origin. The total bacterial count is excessive and fecal organisms of the B. coli type were isolated from inoculations as small as 1 c.c., indicating active and potentially dangerous contamination.

In view of the above facts the following conclusions may be drawn:

1. That the milk station well from which it is proposed to secure a public supply of water for the village of Winthrop, although somewhat unsatisfactorily located with respect to nearby sources of ground water pollution, was apparently furnishing a water free from active contamination and free from marked indications of past pollution at the time of the inspection. This supply, however, has a slight odor of hydrogen sulphide, which renders it somewhat undesirable from an aesthetic standpoint.

2. That the proposed supplementary intake from the St. Regis river would afford opportunity whereby polluted and unsatisfactory water might be pumped into the distribution system of the village.

I would therefore recommend:

1. That in case the well at the milk station be used as a source of public water supply for the village of Winthrop, all privies, privy vaults, cesspools or other receptacles for human excreta within 500 feet of the well be provided with watertight containers from which the contents may be emptied and satisfactorily disposed of at sufficiently frequent intervals to prevent contamination of the ground water.

2. That some form of aeration of the water before pumping into the mains should be provided, in order to remove a large part of the hydrogen sulphide present.

3. That in case this well affords insufficient supply for fire protection, the village sink another well, satisfactorily located, or secure additional supply from any other adequate and feasible source free from possibility of contamination. In no event should provision be made for pumping the St. Regis river water into the mains.

I would further recommend that copies of this report be sent to the local authorities, to the Conservation Commission, and to the sanitary supervisor of the district.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 27, 1917

REPORT OF WATER ANALYSES FOR WINTHROP

Source	Well supply marked A	St. Regis river marked B
Collected on	5/1/17	5/1/17
Color	cl.	70
Odor, hot	1 v.	1 e.
Odor, cold	1 v.	1 a.
Turbidity	tr.	tr.
Ammonia, free	0.041	0.014
Ammonia, albuminoid	0.002	0.122
Nitrites	tr.	tr.
Nitrates	tr.	0.03
Oxygen consumed	0.5	9.0
Chlorine	2.0	0.75
Hardness, total	122.8	23.4
Alkalinity	119.0	21.0
Bacteria per c.c	20	3,700
B. coli type, 10 c.c.	0+3—	3+0—
B. coli type, 1 c.c.	0+3—	3+0—
B. coli type, 1/10 c.c.	0+3—	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

WORCESTER

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the public water supply of the village of Worcester, Otsego county. An investigation of this supply was made on November 22, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Mr. Frank E. Rockfellow, superintendent of the water company.

Worcester is an unincorporated village in the town of Worcester, in the eastern part of Otsego county. It is about 20 miles northeast of Oneonta, and is on the Susquehanna river, and the D. & H. R. R. The population at the time of the inspection was estimated to be about 1,300.

A private sewer which discharges into a creek tributary to the Susquehanna serves two hotels, two stores, the depot and five residences. The remaining portion of the village is served largely by septic tanks, cesspools and privies.

The water supply is controlled by the Worcester Water Company, of which Mr. George I. Wilber of Oneonta, is president. The waterworks were designed and constructed by contract, under the direction of Mr. J. Cowan, civil engineer, in 1888.

The water supply is obtained by gravity from Caryl lake, about one mile northwest of the village. The lake is at an elevation of about 400 feet above the village, and two reducers are installed in the pipe line, by which the pressure in the village is maintained at about 90 pounds per square inch. Twenty-two hydrants are placed in various parts of the village for fire protection. There are about 7 miles of water mains, varying from 4 to 10 inches in diameter. There are about 250 houses in the village, of which about 225 are connected with this supply. Thus about 90 per cent or 1170 of the inhabitants are served by the supply.

In developing the supply the water level in the lake was raised about 2 feet by the construction of a small dam. The intake is several feet under water, and about 75 feet from shore. The lake is said to have an area of about 40 acres, and an average depth of about 20 feet.

The lake has a watershed of about .16 of a square mile. There are two cottages on the lake, which are used only during the summer, one of these cottages is located a short distance from the intake, and the privy is subject to overflow and excretal wastes may be washed into the lake during rains. The land surrounding the lake is hilly, although there is a small amount of swamp land at the upper end of the lake.

At the time of the inspection a sample of the water was obtained from a tap in the village, and the results of the analysis of this sample, together with those previously made by the Division of Laboratories and Research will be found in the appended table.

From the results of these analyses it will be seen that the water has a small amount of color, apparently due to the swampy land, is practically free from turbidity and is moderately soft. The figures for nitrogen in its various forms are comparatively low with the exception of that for albuminoid ammonia, and the high figures in this test, together with the high oxygen consumed are undoubtedly due to the color and organic matter from the swamp. The total counts of bacteria are usually low and organisms of the B. coli group have been found only occasionally in 10 c.c. inoculations.

As a result of this investigation and of the analyses, it may be concluded that the water supply of the village of Worcester is apparently of a satisfactory sanitary quality, except for pollution from the privy of the cottage near the intake and from cattle pasturing in the field adjacent to the lake.

In view of the above conclusion, I would make the following recommendations:

1. That the water company secure the removal of the privies at the two cottages near the lake to such a distance as may be found necessary to prevent any contamination of the waters of the lake from these sources; or provide privies with water tight removable containers, the contents of which should be frequently emptied or disposed of by burial at some point off the watershed tributary to the lake.
2. That cattle be prevented from pasturing within 50 feet of the lake, within a distance of 500 feet from the water supply intake.
3. That should any difficulty be experienced in carrying out the above recommendations, application be made to this Department for the enactment of rules and regulations for the sanitary protection of the supply.

In conclusion, I would further recommend that copies of this report be transmitted to the Worcester Water Company, the local authorities, and the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *March* 22, 191"

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
						ODOR		SOLIDS			NITROGEN AS—						HARDNESS			Bacteria per c.c.; gelatin 20°, 48 hours	B. COLI TYPE +=PRESENT −=ABSENT		
				Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
Worcester	Otsego	Tap in village	1/19/11	Tr.	Cl.			28		17	.016	.092	.003	Tr.	2.40	0.25	14.3	11.0	70	−	−	−
Worcester	Otsego	Tap in village	4/ 4/11	5	2			26		17	.012	.078	.001	0.10	2.50	1.25	14.3	7.0	70	−	−	−
Worcester	Otsego	Tap in village	7/20/11	Tr.	Cl.			30		19	.004	.090	.001	Tr.	2.00	0.75	11.1	4.0	350	−	−	−
Worcester	Otsego	Tap in village	9/ 6/11	10	Tr.			33		15	.008	.042	.001	Tr.	1.10	1.50	14.3	10.0	400	−	−	−
Worcester	Otsego	Tap in village	10/10/11	10	5			24		15	.010	.090	.001	0.04	1.30	1.00	12.7	12.0	80	−	−	−
Worcester	Otsego	Tap in village	11/21/11	5	Cl.			22		14	.016	.114	Tr.	Tr.	1.30	1.00	11.1	7.0				
Worcester	Otsego	Tap in village	12/19/11	5	Tr.			23		12	.022	.030	.001	0.08	1.74	1.50	9.5	7.0	140	−	−	−
Worcester	Otsego	Tap in village	2/ 2/12	Tr.	Tr.			33		23	.018	.078	Tr.	0.04	1.80	1.25	12.7	6.0	30	−	−	−
Worcester	Otsego	Tap in village	4/12/12	10	Tr.			21		17	.026	.088	.001	0.06	1.90	0.75	16.9	6.0	300	−	−	−
Worcester	Otsego	Tap in village	9/11/12	Tr.	Cl.			44		24	.002	.072	.001	0.04	1.50	0.75	11.1	6.0	80	−	−	−
Worcester	Otsego	Tap in village	11/16/12	10	Cl.			34		21	.012	.036	.001	0.04	2.50	1.00	11.1	4.0	170	−	−	−
Worcester	Otsego	Tap in village	1/ 9/13	5	Cl.			27			.003	.084	Tr.	0.04	1.80	0.37	7.9	6.0	20	−	−	−
Worcester	Otsego	Tap in village	3/ 4/13	5	2			36			.014	.105	Tr.	0.10	2.00	0.75	12.7	5.0	5	−	−	−
Worcester	Otsego	Tap in village	4/29/13	8	2			29			.004	.080	.001	0.04	1.90	0.75	12.7	5.0	20	−	−	−
Worcester	Otsego	Tap in village	6/20/13	7	3			28			.022	.092	Tr.	0.02	2.30	0.75	7.9	5.0	30	−	−	−
Worcester	Otsego	Tap in village	11/25/13	15	3			30		18	.010	.082	.001	0.04	3.30	1.13	11.1	7.0	90	−	−	−
Worcester	Otsego	Tap in village	11/22/16	5	Tr.	1 v.	1 v.				.006	.078	Tr.	0.02	2.90	0.50	35.1	7.0	30	−	−	−

WYOMING

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of the sanitary condition of the public water supply of Wyoming, made by Mr. C. M. Baker, assistant engineer, on August 2, 1917.

General information

Location.— Town of Middlebury, northeastern part of Wyoming county, on the B. R. & P. R. R.

Population.— Unincorporated village. Estimated population 450.

Waterworks in charge of — Wyoming Water Company.

Source of supply.— Springs ½ to ¾ mile northwest of village.

Consumption.— No definite information.

Distribution system.— Gravity system. About 1½ miles of mains, ranging from 1 to 2 inches in diameter. No fire hydrants.

Service taps.— 100, none of which are metered.

Pressure.— 40 pounds per square inch.

Storage.— Reservoir, 10,000 gallons.

Purification.— None.

Reference to previous investigations.— 1915, page 725, 36th Annual Report.

At the time of the previous investigation certain unsatisfactory conditions were found to exist. These conditions were, principally that the quantity of water supplied was insufficient for the needs of the village at times, and also that inadequate development of the springs from which the supply is obtained resulted in possible pollution of the water under certain conditions. The following recommendations were therefore made at the time of the previous investigation.

1. Develop the present supply to a further extent or secure additional water from some other satisfactory source.
2. Protect the springs more carefully from contamination and surface water by the construction of concrete basins around each spring, the basins to extend 1 foot above the surface of the ground and to have a tight cover which can be kept locked.
3. Provide a water tight bottom for the reservoir.
4. Install a larger main from the springs and reservoir to the village.
5. Flush the water mains at sufficiently frequent intervals to keep them free from deposits.

Since the previous investigations the Water Company has changed hands and certain improvements have been made in the development of the supply, both with reference to protection from pollution and to securing a more ample supply of water. The springs have been cleaned and walled up to protect them from surface wash, and a new concrete reservoir, with a capacity of about 10,000 gallons, has been constructed about the main spring. Leaks which had developed in the main leading from the reservoir to the village have been repaired, and it was stated that sufficient water is now supplied for domestic purposes. As pointed out in the previous report, however, no hydrants are provided for fire protection.

Although the springs are now so developed as to be protected from surface wash, they are located in pasture land or cultivated fields, and there still appears to be some possibility of pollution by rapid infiltration of surface water, since they are not adequately protected by fences and drainage ditches.

Samples of water were collected at the time of the inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of these analyses show a water slightly colored but clear, and also a water high in hardness. The bacterial count is high, and colon bacilli were found present in all 3 of the 10 c.c. inoculations, thus indicating the presence of active contamination. The high bacterial count may be due in part, at least, to delay in transit, 2 days elapsing from the time the samples were collected until they were received at the laboratory. The presence of colon bacilli is probably due to the rapid infiltration of water from cultivated fields or pasture land, the possibility of which was pointed out above.

As a result of this investigation it may be concluded:

1. That the present water company has in the main carried out the recommendations of our previous report.
2. That, however, there still appears to be some opportunity for pollution, as is indicated by the analytical results of the sample collected at the time of the inspection.

In view of the above, I beg to offer the following recommendations to be acted upon by the water company:

1. That a sufficient area be enclosed about each of the springs, and that suitable drainage ditches be constructed within this enclosure to divert surface water, in order to prevent possible pollution of the supply by the rapid infiltration of polluted surface water.
2. That, if pollution is still found present in the water after the above recommended improvements are carried out, the necessary steps be taken to determine the source of such pollution, and to adequately protect the supply therefrom.

I would further recommend that copies of this report be transmitted to the local authorities, and to the sanitary supervisor of the district.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 14, 1917

REPORT OF WATER ANALYSIS FOR WYOMING, N. Y.

Source		Tap, public supply
Collected on		8/2/17
Color		5
Ammonia, free		.006
Ammonia, albuminoid		.006
Nitrates		.20
Oxygen consumed		.40
Chlorine		1.75
Hardness, total		228.4
Alkalinity		204.0
Bacteria per c.c.		2,000
B. coli type	10 c.c.	3+0—
	1 c.c.	0+3—
	1/10 c.c.	0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

YOUNGSTOWN

LINSLY R. WILLIAMS, M.D., *Acting State Commissioner of Health:*

I am enclosing herewith a copy of the report on an investigation of the sanitary condition of the public water supply of Youngstown, made by Mr. C. M. Baker, assistant engineer, on December 6, 1916.

General information

Location.— Niagara county, near mouth of Niagara river.
Population.— 800, all served with the public water supply.
Source of Supply.— Niagara river.
Consumption.— 80,000 gallons daily, 100 gallons per capita.
Distribution System.— Pumped through mains to standpipe.
Service Taps.— 140, none metered.
Pressure.— 35 to 45 pounds per square inch.
Storage.— 60,000 gallon standpipe.
Purification.— Mechanical pressure filter; without use of alum.
Reference to Previous Investigations.— Report, July 27, 1915.
In the previous report it was pointed out:

1. That the raw Niagara river water is dangerously contaminated.
2. That the purification plant was ineffective in removing this pollution, due to its incomplete equipment and inefficient operation.
3. That there is considerable danger of pollution of the local wells from which water is principally obtained for domestic purposes.

As a result of these conditions and the dangerous condition existing at Youngstown, with respect to the water supply, the following recommendations to be acted upon the village authorities were made in the previous report:

1. That steps be taken immediately to improve the present filter plant and its method of operation by
   (a) The design and installation of an apparatus for the satisfactory application of alum to the water before it passes upon the filter.
   (b) Installing additional filters if no supplementary treatment is provided.
   (c) Rearranging the pipe connections supplying the wash water for the filter, so that the filtered water may be obtained from the standpipe for washing the filter, and wasting the first filtrate after washing.
   (d) Preventing the discharge of untreated water directly into the mains under any circumstances.
2. That, in view of the seriously contaminated condition of the Niagara river, and of the somewhat unreliable results obtained from this type of filter, and also in view of the comparatively high rate at which the present filter must be operated, suitable apparatus be provided for the constant sterilization of the filtered water with liquid chlorine.
3. That as soon as the above improvements are carried out and it can be shown that satisfactory results are being obtained, the well supplies be abandoned. It also seems advisable that regular analyses of the water be made during the year to control the operation and determine the effectiveness of the plant, and in view of the obvious lack of efficient operation of the filter plant, as above pointed out, and to the prime importance of this feature as affecting the safety of the water supply, it is suggested that the village follow out the plan which is now being generally adopted by the more progressive waterworks managements in this State of engaging the services of a competent consulting expert to make occasional visits to the plant during the year to study the local conditions and operation of the filters and give detailed advice as to the best methods to employ to improve the operation of the plant and maintain it at its highest possible efficiency.

As a result of the present investigations it is apparent that the village has taken no action whatever on the previous recommendations and, in fact, it appears that the village officials are indisposed to take any definite steps toward the securing of a pure and wholesome water supply. There is a controversy between the village and the company that installed the water purification plant, regarding settlement for the plant. The village contends that

the filter does not meet the guarantee given by the company and they have, therefore, held back part of the payment for the equipment. Due to these negotiations, which have been pending for some 5 or 6 years, the village authorities do not feel justified in taking any action regarding the matter, due in part to the fear of complicating the legal aspects of the case, if they in any way tamper with the present installation. It seems, however, that the installation of a liquid chlorine plant, as recommended by this Department, thus showing the necessity of additional equipment, in order to render the water satisfactory for potable purposes, would tend to strengthen the case of the village, especially since this could be accomplished without in any way altering the present installation.

Considerable emphasis is placed by the village authorities upon the fact that people of the village do not use the water of the public supply for potable purposes, but that they use water from local wells. This is a factor, however, which was discussed to a considerable extent in the previous report, in which report it was pointed out that there is considerable danger of these wells becoming polluted, and in fact, samples collected from a well near the center of the village at that time indicated active contamination. Furthermore, the village should not lose sight of the fact that, although the inhabitants know the insanitary condition of their public supply, the traveling public is not familiar with these conditions and is, therefore, quite apt to draw water from any convenient faucet for drinking purposes. The question then involves not only the protection of the inhabitants of the village, but also the protection of visitors thereto. It seems, therefore, that the providing of a pure and wholesome public water supply is of vital importance to the village of Youngstown, and that the matter should receive the careful consideration of the village officials.

Samples of the water were collected at the time of the present inspection and sent to the Division of Laboratories and Research for analyses, the results of which are recorded in the appended table.

The results of these analyses are corroboratory of previous statements, in that they show the unquestionably contaminated condition of the raw water and the ineffective purification accomplished by the filters. In fact, in this particular instance there were a greater number of bacteria in the filtered than in the unfiltered water, and colon bacilli were almost as prevalent.

As a result of this investigation then, it may be concluded:

1. That the public water supply of Youngstown is at practically all times seriously contaminated and unsafe for potable purposes and is, therefore, a menace to the health, not only of the inhabitants of Youngstown, but also of visitors to the village.
2. That the village officials have appeared heretofore to be disposed to take the necessary steps to improve these conditions, since nothing has been done to carry out the recommendations of the previous report.

In view of the above, I beg to recommend that the village officials be again urged to proceed with the least possible delay to secure the carrying out of the recomendations of the previous report.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *February*, 7, 1917

REPORT OF WATER ANALYSES FOR YOUNGSTOWN, N. Y.

Source		Raw water from Niagara river	Filter effluent marked "B"
Collected on		12/6/16	12/6/16
Ammonia, free		.....	.002
Ammonia, albuminoid		.....	.068
Nitrites		.....	.003
Nitrates		.....	0.02
Oxygen consumed		.....	1.90
Chlorine		.....	8.88
Hardness, total		.....	102.8
Alkalinity		.....	98.0
Bacteria per c.c.		20,000	51,500
B. coli type	10 c.c.	3+0—	3+0—
	1 c.c.	3+0—	3+0—
	1/10 c.c.	2+1—	1+2—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m musty; v, vegetable.

In addition to the investigations listed above, inspections regarding water supplies were made and letter of advice transmitted to the local authorities in the following instances:

Amsterdam, Binghamton State Hospital, New York City, Peekskill State Camp (Swimming Beach for Boys Camp), Plattsburgh, Poughkeepsie (Hudson River State Hospital), Valatie (State Farm for Women Offenders), Wingdale (Water Supply for Proposed Prison).

TRANSMITTAL OF REPORTS UPON ANALYSES OF PUBLIC WATER SUPPLIES

During 1917 the reports by the Division of Laboratories and Research upon analyses of public water supplies have been transmitted by the Engineering Division. The departure from past procedure was due to the fact that practically complete information regarding nearly all the public water supplies of the State is now on file with the Engineering Division. With detailed knowledge of the sources of the various supplies it is evident that more satisfactory interpretation of analyses can be made than where such information is incomplete or wholly lacking. Furthermore, in many cases, recommendations for improvements had been made by this Department following the investigation of water supplies by the Engineering Division and, therefore, at such times as the results of additional analyses have been transmitted to the local authorities opportunity has been given to again bring up the matter of such improvements. During the year some 75 letters transmitting water analyses have been sent out.

INVESTIGATIONS OF COMPLAINTS RELATING TO STREAM POLLUTION

INVESTIGATIONS OF COMPLAINTS RELATING TO STREAM POLLUTION

The discharge into the watercourses of this State of sewage, garbage, industrial wastes, and other refuse is the source of many complaints made each year to the Department. These complaints usually come from property owners and other persons adversely affected by these nuisances. Very often requests for assistance and advice in dealing with these cases of stream pollution come from local boards of health or village officials.

Where such procedure is feasible the complaints are referred to local boards of health for suitable action under the Public Health Law but in many cases it becomes necessary for the Engineering Division to make a careful investigation and prepare a report describing the conditions found to exist and the extent to which they give rise to the nuisance or menace to health. Such report containing conclusions and recommendations as to the remedial measures which should be taken is then transmitted to the local authorities. In most cases this is all that is necessary to secure an immediate abatement of the nuisances, but where necessary, legal action is taken for preventing the pollution of streams to the detriment of the public health.

The reports upon the more important of such cases which came before this Department during 1917 are given below and a list is also appended of all other cases.

BUTTERFIELD LAKE

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the alleged insanitary conditions at Butterfield lake, Jefferson county, N. Y. The investigation was made as a result of complaints received at this Department with reference to the pollution of Butterfield lake by the discharge of sink drainage, sewage and garbage from the cottages situated on the lake. The inspection was made on October 10, 1917, by Mr. Albert I. Howd, inspecting engineer in this Department, in company with Dr. J. E. Ryan, health officer at Redwood, in the town of Alexandria, Jefferson county, N. Y.

Butterfield lake, which is about 3 miles long and ¾ of a mile wide, is located in the northwestern part of Jefferson count in the towns of Theresa and Alexandria. The town line extends northeast through the lake with the result that about half of the lake lies in each town. There are about 38 cottages scattered around the shores of and the islands of the lake, they being generally in groups of 3 or 4. The land is very rocky and rugged, more so on the east side of the lake than on the west side. On the west side the soil is generally sandy or gravelly and not so hilly as on the east side. There are several islands in the lake and most of them have camps on them. It is said that the land surrounding the lake is abundant with springs and most of the campers utilize these sources of potable water. Water for general household purposes is obtained in most instances from the lake, nearly all the camps having pipes running from the lake to the camps through which water is pumped.

The majority of the camps have privies located a short distance from them, this being so at 30 out of about 38 camps. At 4 camps privies were located directly over the lake and at 13 more camps the privies were 50 feet or less from the lake. Eleven privies were found which were more than 50 feet from the lake. Inside toilet facilities were found at six camps of which number, 4 evidently treat their sewage in cesspools and the remaining two discharge their sewage through castiron pipes into the lake. At two other camps it was assumed that sink wastes discharge into the lake inasmuch as lead pipes were found leading down to the lake from the camps.

As nearly all the camps were unoccupied at the time of the inspection, it could not be definitely learned how the garbage and refuse from the camps are disposed of. At one camp on Buck island, however, namely that of Anna Dyer, of Redwood, N. Y., garbage and empty tin cans had been thrown into the lake.

At present Butterfield lake is by no means congested with camps and there is ample space for extension. There are a couple of camps now in course of construction. Although the extent of sewage discharged into the lake at present appears to create no nuisance, nevertheless some other method should be used in disposing of the sewage such as by cesspools, or settling tanks with subsurface irrigation. It also appears from the inspection that some garbage and rubbish are being thrown into the lake. This practice should be discontinued and the garbage and rubbish be disposed of by some other method, such as by burying. The majority of the privies were in an insanitary condition, nearly all of them being provided with no vault and being open and readily accessible to flies. The privies therefore, should be made fly-tight and provided with vaults. The sewage from a few places in the village of Redwood, such as the hotel Dollinger, is discharged through private drains so that the sewage eventually finds its way into the lake, although the village is quite some distance away. These places should discontinue such discharge and use some other method of disposal such as by cesspools or settling tanks with subsurface irrigation. The village has no sewer system, most of the properties being provided with privies.

As a result of this investigation I would suggest that the local boards of health of the towns of Theresa and Alexandria be advised to enforce the following requirements and changes in conditions at Butterfield lake:

1. That no sewage or sink waste shall be discharged into Butterfield lake;

2. That no garbage or rubbish shall be discharged into Butterfield lake;

3. That no privies, unless provided with removable water tight containers, shall be located within 25 feet, horizontal measurement, of Butterfield lake;

4. That all privies shall be made fly-tight and provided with vaults;

5. That sewer pipes from the village of Redwood, which eventually discharge sewage into Butterfield lake, shall be disconnected and the sewage disposed of in cesspools or settling tanks with subsurface irrigation.

I further recommend that copies of this report be transmitted to the complainants and to the local boards of health of the towns of Theresa and Alexandria and that the local boards of health be urged to take immediate steps to carry out the recommendations of this report.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 16, 1917

Copies of this report were enclosed in letters addressed to the local boards of health and to the complainants.

COLONIE (town)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of an alleged nuisance in the town of Colonie, caused by the pollution of the Lisha Kill creek, near Karners on the New York Central railroad. The inspection was made on October 29, 1917, by Mr. Albert I. Howd, inspecting engineer in this Department, in company with Mr. H. J. Mather of the Department of Agriculture, Dr. H. C. Abrams, Grant Newcomb, John J. Brown and J. G. Hills, members of the local board of health of the town of Colonie.

It is alleged that the pollution of the creek took place about two years ago at the time of the foot and mouth disease outbreak. The pollution of the creek resulted from the dumping of a thick, heavy, tarry substance near the edge of the creek. The pile of material is at present about 60 feet long, about 15 feet wide and has a varying depth of about 5 to 10 feet and is partly covered with cinders. The deposited substance is quite hard on the surface but just underneath the surface it is soft and tar like and has a very noticeable bituminous and oily tar odor. The water of the creek near the dump appeared very oily when agitated and had an oily odor.

This alleged nuisance was first brought to the attention of this Department on December 8, 1916, when a Mr. Joseph Finley, representing himself and other residents of the town of Colonie, near Lisha Kill, called at the Department and conferred with Mr. Horton in reference to this nuisance. Mr. Finley was advised at that time as to the proper procedure to take for the abatement of this nuisance but evidently the matter was dropped by him inasmuch as the Department has no record of anything being done.

A branch of the Lisha Kill mentioned above flows near the dump and then flows north and east for about ½ or ¾ of a mile where it joins the main stream. During its course the creek flows across the property of Joseph Finley, John Meachan and John Cole in the order named, the Cole property being about one mile from the dump. On this property the creek appeared clear and showed no visible signs of pollution. No oil appeared on the surface of the creek and no sediment of a tarry nature could be detected on the creek bed. The land near the creek is low and water had settled in some of these low places. The creek overflows its banks occasionally and floods this low land. At some of these low spots, oil appeared on the surface of the water and the water had an oily odor similar to that detected near the dump.

Mr. Cole, who is an unlicensed veterinarian, alleges that he had a colt pastured in the field near the creek and about four weeks ago the colt died. He stated that the hair from the colt's legs just above the hoofs had come off, caused by the colt going into the oily water. He also alleges that the hair came off from his other stock whenever they came in contact with the oily water, and that they refused to eat the hay cut near the creek.

As a result of this investigation, I conclude:

1. That a mass of material of a tarry nature has been dumped from cars of the N. Y. C. R. R. near the Lisha Kill about 2½ miles northwest of Karners:
2. That the drainage from this material finds its way into the creek and causes continuous pollution;
3. That as a result of this pollution, alleged injury and loss to property has occurred;
4. That this mass of material constitutes a nuisance and the nuisance can most properly be abated by removing the material.

I, therefore, recommend that in view of this pollution of the Lisha Kill the mass of material which is causing such pollution be removed from its present location.

I further recommend that copies of this report be sent to the local board of health of the town of Colonie and to the N. Y. C. R. R. Co., and that they be urged to carry out the recommendations of this report.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *November* 14, 1917

Copies of this report were sent to the local board of health and to the N. Y. C. R. R. Co., urging them to carry out the recommendations of the report.

TROY

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the alleged pollution of the Hudson river by the discharge of oil from the plant of the Rail Joint Co., at Troy, made at your direction and as the result of a complaint referred to this Department by the Commissioner of Public Works of the city of Albany.

This complaint alleged that large quantities of oil entered the river through the sewer of the plant of the Rail Joint Co. at Troy. The inspection was made by Mr. C. A. Holmquist, assistant engineer in this Department on June 5, 1917.

The plant of the Rail Joint Co. is situated in what is locally known as South Troy in the southern part of the city of Troy on the east side of the Hudson river. The home office of the company is at 61 Broadway and Mr. E. Y. Weber of New York is president of the company, Mr. W. J. Bradley is the local manager and superintendent and Mr. M. J. Maloney is assistant superintendent of the Troy plant.

This plant, it was learned, has been in operation for more than 50 years at the present site and has been under the present management for from 12 to 15 years. The company manufactures rail joints of various shapes from steel ingots at this plant. Although coal is used as fuel at the power plant the two furnaces in which the ingots and shapes are heated are fired with fuel oil.

It was learned at the time of the inspection that the discharge of oil in large quantities into the Hudson river through the sewer from this plant was recently called to the attention of the local manager of the company by the government engineers who were making a survey of the river opposite the plant. As the result of this an investigation was made by the company which showed that a leak existed in the oil force main which leads to one of the furnaces of the plant of the Rail Joint Co. and that some 150 gallons

of oil were escaping from this leak and had probably been escaping for from 4 to 6 weeks before it was discovered. It appears that this oil found its way into the sewer which runs through the plant and discharges into the Hudson river. This leak was remedied by replacing the defective section of the oil force main by a new pipe and by repairing the sewer. Inspection chambers have also been constructed along the line of the force main at various points for the purpose of facilitating the discovery of similar leaks in the future.

An inspection of the sewer outlet of the plant of the Rail Joint Co. showed that except for an occasional globule of oil which presumably seeped from the saturated ground near the leak of the force main only a comparatively small quantity of light oil escaped from the sewer at this plant. The river bank near and below the outlet sewer was however covered with oil and oil was found in pools along the bank of the stream in certain places. It was stated by the superintendent of the plant that the soil on the bank of the river which is saturated with oil is to be removed and replaced either with cinders or new soil in order to prevent oil from reaching the river at times of high water and a number of loads of cinders had already been deposited near the outlet at the time of the inspection.

A number of other plants along the Hudson river in Troy including the plant of the Burden Iron Co. at Troy, and the gas works at Troy, Cohoes and Albany were visited but it was found that only a negligible quantity of oil reached the river from the sewers of these various plants and in all probability the oil thus discharged into the river is soon volatilized. It could not be traced for any considerable distance below each outlet.

In conclusion I would state that it was found from the investigation that considerable quantities of fuel oil had escaped into the river from a leak in the oil force main at the plant of the Rail Joint Co. about the time of the receipt of the complaint by this Department but that this leak had been stopped and the condition largely remedied. Steps should, however, be taken by the Rail Joint Co. to remove the pools of oil along the bank of the river near the outlet of their sewer together with the soil along the bank near the outlet sewer which is saturated with oil, in order to prevent the oil from being carried down the stream at times of high water.

I would, therefore, recommend that copies of this report be sent to the Commissioner of Public Works of the city of Albany and to the Rail Joint Co. and that the latter be advised to take immediate steps to remove the oil and the soil saturated with oil on the bank of the Hudson river in the vicinity and below the outlet sewer of the plant of this company at Troy.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 11, 1917

Copies of this report were sent to the authorities noted above.

In addition to the foregoing, inspections were made and reports transmitted to local authorities or advice was given through correspondence in cases of stream pollution at the following places: Johnstown, Little Moose Lake, Millerton, Waterloo, Upper Hudson River.

INVESTIGATION OF PUBLIC NUISANCES NOT ARISING FROM STREAM POLLUTION

[605]

INVESTIGATION OF PUBLIC NUISANCES NOT ARISING FROM STREAM POLLUTION

Many requests are received at this Department each year from local health authorities as well as from citizens asking for the assistance of the Department in the suppression of local nuisances. Insanitary methods of garbage and refuse disposal; improper operation and maintenance of rendering and fertilizer plants; insanitary conditions arising from lack of sewerage facilities such as overflowing cesspools and privy vaults; emission of smoke and fumes from industrial establishments; inefficient treatment and discharge of creamery wastes; are among the many forms of nuisance which though not associated with stream pollution, cause complaints and frequently require investigations and reports by the Engineering Division and notices or orders from the Department.

The reports of the investigations made by this Department in the more important cases of nuisances which have come before it during 1917 are given below and a list is appended of all other cases.

BEACON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of an alleged nuisance due to the insanitary condition of the natural watercourse at Beacon, Dutchess county, commonly known as the "Asylum Ditch." A petition, signed by 19 residents of the city of Beacon complaining of the condition of this ditch, was received by this Department on September 4, 1917, and the inspection on which this report is based was made by Mr. Henry Ryon, inspecting engineer in this Department, on September 10, 1917.

The watercourse in question has its origin on the grounds of the Matteawan State Hospital about ¼ mile north of the main buildings and from there extends southward, passing between the main buildings and the barn, a distance of 1¼ miles, to Wilks street in the city of Beacon. A branch ditch about ¾ mile long starts at a point 2,000 feet west of the main buildings of the hospital and passing to the west of the barn joins the main ditch just before it reaches Wilks street. The land through which this upper part of the ditch passes is used partially as meadow and partially for the production of crops. The ditch receives the surface drainage from this land and the discharge from the underdrains from some of the fields. It also receives the overflow from the suction well at the hospital waterworks pumping station. At the time of the inspection this part of the ditch was practically dry. Pools of clear water were found at intervals along the bottom but there was no flow. There was nowhere in this section any evidence that the ditch was receiving any water or wastes that could cause an offensive or insanitary condition. No pipes except those noted above discharge into the ditch and

at its nearest point the ditch is 300 feet from the barns and piggery and the intervening ground was free and clear of any offensive material. All of the barns and all the buildings and yards connected with them are drained to a concrete tank from which the liquid is pumped and used on the fields. The ditch is clear throughout this section, walled with field stone in places, but generally having sloping banks covered with sod. The width of the bottom of the ditch is about 18 inches.

From Wilks street the ditch continues in a southerly direction across open fields for a distance of 900 feet to Kent street. Here the conditions are practically the same as on the asylum grounds north of Wilks street. There was at the time of the inspection no flow, but pools of clear water occurred at intervals.

At Kent street the conditions change, and from that street to Old road, a distance of 300 feet, the ditch passes through poorly kept back yards and is used for the disposal of wash water, garbage and other wastes. The pools of water here were cloudy and black, due to the decaying organic matter in them, but there was no noticeable odor.

From Old road to George street, a distance of 800 feet, the ditch was entirely dry and badly overgrown with weeds and brush. The yards of several houses extend to the ditch on the west and on the east there are open fields. Considerable rubbish was found along the banks but no liquid waste of any kind was observed. Through this section the banks are protected by dry rubble walls for nearly the entire distance.

From George street to Main street the ditch is walled with stone and covered with wooden planking. Most of this planking was at the time of the inspection in very bad condition and at some points portions of it had fallen into the ditch. Rubbish, garbage and liquid wastes from the houses had evidently been dumped along each side of and into the stream. Several poorly kept chicken yards extend to the edge of the ditch. The water in this section was flowing sluggishly, was badly polluted and at places full of mosquito larvae. A very distinct odor of stale sewage was noticeable in the ditch but could not be detected on the bank. It should be noted, however, in this connection, that the day was clear and cold so that odors would not be as readily noticed as under different atmospheric conditions. The ditch is approximately 3 feet wide and 3 feet deep throughout this section.

Below Main street the stream turns southeast and crosses open fields for a distance of 1,000 feet to Teller avenue. The sides of the ditch are sloping and covered with sod. No objectionable condition was found in this section except in the rear of a single house at the upper end, where the bottom of the ditch was partially obstructed by rubbish. There was some flow in this section and the water was slightly turbid.

From Teller avenue the stream continues in an easterly direction, flowing over a natural bed with a good grade a distance of 1,200 feet to Fishkill creek. The greater part of this distance is through woods, but at the lower end the stream passes under several buildings. No conditions were observed here that could be called insanitary or unsatisfactory. The banks were clean and the water only slightly turbid.

The ditch receives some storm water from the streets that it crosses, but only that coming from a short distance on each side. Storm water sewers take care of most of the street drainage. No outlet discharging sanitary sewage was found at any point along the ditch.

The insanitary condition of the ditch through the center of the city appears to be due almost entirely to the fact that the people living along the stream deposit rubbish, garbage and liquid wastes in the ditch and on the ground nearby. If this objectionable practice could be stopped the cleaning of the ditch and the adjacent properties would to a great extent abate the nuisance. It would seem desirable, however, to permanently improve the condition by constructing a conduit of concrete or other suitable material along the course of the present ditch with a smooth evenly graded invert that would not permit the water to collect in pools. The conduit could be either open or closed.

The latter form, although more expensive, would have the advantage of preventing people from throwing refuse into the stream. In either case the conduit should be of ample size to carry the run-off from the area tributary to it, and all sanitary or domestic sewage should be excluded. The upper and lower sections of the stream do not appear to be in urgent need of grading or regulation at the present time.

I would therefore recommend that the board of health of the city of Beacon take such action as may be necessary to improve the sanitary condition of the properties adjacent to the ditch and to prevent people from throwing garbage and rubbish and liquid wastes into the stream; and that the city consider the matter of building a conduit along the course of the present ditch of ample size to carry the water that will come to it and to be used exclusively for storm water, no sanitary sewage being admitted at any point.

I would further recommend that copies of this report be sent to the city authorities and to the petitioners and that the city authorities be requested to take action along the lines suggested herein.

Respectfully submitted,

THEODORE HORTON,

ALBANY, N. Y., *September* 28, 1917 *Chief Engineer*

Copies of this report were transmitted to the Board of Health of the city and to the city authorities, urging that the recommendations of the report be carried out.

BINGHAMTON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of an alleged nuisance caused by the operation of the chemical works of the States Metals Company at Binghamton, made at your direction and as the result of a complaint by Mr. C. H. Hayes of Binghamton on behalf of himself and some 100 residents living in the vicinity of the works.

The inspection was made by Mr. C. A. Holmquist on December 18 and 19, 1916, in company with Mr. John R. Doan, manager of the chemical works, and two of his assistants. A conference in reference to these works was also held in the mayor's office with the mayor, the commissioner of public safety and the assistant corporation counsel of Binghamton. The health officer of the city and many of the complainants and residents in the vicinity of the chemical works were also interviewed.

It was learned that the operation of the chemical works has been the source of numerous complaints to the health department of Binghamton for the past two years and that as the result of such complaints a number of hearings in the matter have been held before the commissioner of public safety of the city. The first hearing was held in 1915, and in 1916 three hearings were held, namely, on January 18, January 25 and February 8, respectively. At these last hearings 28 witnesses for the complainants and 18 witnesses for the defendants testified under oath. Both parties were represented by counsel, who later prepared and presented briefs in the matter. The testimony taken at these hearings covers 197 typewritten pages. The following decision was rendered by the commissioner of public safety on May 12, 1916:

In the matter of the Complaint against the Chenango Chemical Company for an alleged nuisance

Having carefully considered the evidence taken in the above entitled matter and having heard and considered the arguments submitted by counsel for the respective parties I find as follows:

1. Certain gases and odors have escaped from the plant of the said Chenango Chemical Company during the past year or more, which have caused more or less annoyance and inconvenience to people living in the neighborhood of said plant, and at times the machinery of said plant has caused noises and vibrations annoying to said neighbors.

2. The evidence is conflicting as to the extent and duration of said annoying occurrences, but there is no convincing evidence in the case that the health of any person has suffered or that life has been endangered by either gases or odors which have escaped from the said chemical plant.

3. The said Chenango Chemical Company, upon its attention being called to the said facts and pursuant to notice given to it by the bureau of health of the city of Binghamton, has taken and is now taking such precaution to prevent the recurrence of any of said causes of complaint that thereby they have ceased either in whole or in a large part.

4. The evidence in the case does not show grounds sufficient to warrant interference with said plant by the bureau of health of the city of Binghamton as being "dangerous to human life and health."

5. Under the evidence in the case there is reasonable doubt as to whether the use of this plant by said company in its location is unreasonable under all the circumstances and as to whether a nuisance of any kind in fact now exists.

6. If such use is unreasonable or if any nuisance actually exists the complainants have an adequate remedy at law.

Under the circumstances therefore I am of the opinion that the bureau of health of the city of Binghamton should not interfere in the matter, and in support of this position I cite the following cases:

Copeutt v. Board of Health, 140 N. Y.
McCarty v. Gas Company, 189, N. Y. 40.
Gasse v. Development & Funding Co., 135 N. Y. Sup. 732.
Booth v. Railway Co., 140 N. Y. 267.
People v. Transit Development Co., 115 N. Y. Sup. 297.
Yates v. Milwaukee, 77 U. S. 497.

The proceeding is dismissed.

(Signed) F. W. SPAULDING,
Deputy Commissioner of Public Safety

May 12, 1916

The chemical works of the States Metals Company, of which Mr. George R. Parker, 50 Church street, New York city, is president, and Mr. J. R. Doan of Binghamton is manager, is located on Frederick street in the northern part of the city and occupies the greater portion of the square bounded by Frederick, Heman, State and Chenango streets. It is situated practically in the center of the developed residential and business section of that portion of the city. The buildings occupied by the works have been used for industrial purposes for many years previous to their use in the manufacture of the chemicals.

According to the statements made by Mr. Doan, manager of the chemical works, the plant was operated by the Chenango Chemical Company from May, 1914, to December 18, 1915, under the management of Mr. Doan, during which time cobalt oxide, cobalt sulphate, cobalt acetate, cobalt carbonate, single and double salts of nickel, sulphate of manganese and sulphate of antimony or antimony sulphurette were manufactured. From December, 1915, to date the plant has been operated by the States Metals Company also under the management of Mr. Doan. Only sulphate of antimony used for vulcanizing rubber has been manufactured by this company since March or April, 1916.

The process of the manufacture of antimony sulphurette, generally and very briefly stated, consists of dissolving antimony ore with other chemicals in water while being agitated mechanically and heated with steam; precipitating the solution thus formed and washing, drying and pulverizing the resulting precipitate.

The principal gas evolved, which is a by-product in the operation and one which is not condensed or recovered in the process of manufacture, is hydrogen sulphide. This gas is generated in the precipitation vats and is also liberated from the waste water which is pumped from the filters and allowed to run over the floor to the sewer. Although the odor of hydrogen sulphide was given off in the precipitation room in moderate quantities, it could not be detected outside of the buildings at the time of the inspection.

This gas, it may be stated, has a very objectionable odor resembling that familiarly associated with decomposing eggs. In concentrated amounts there can be no doubt as to the suffocating or poisonous nature of this gas and there is little doubt that in the continuous presence of considerable amounts of hydrogen sulphide the health of persons will be indirectly if not directly affected.

The manager of the works stated that this gas together with other gases or vapors such as SO_3 given off from the process of manufacture of other chemicals as sulphate of manganese was formerly passed through baffled scrubbers filled with cobbles where it was sprayed with steam and water before being discharged into the atmosphere but that the scrubbers are no longer in use, sulphate of manganese being no longer manufactured and the process of making antimony sulphurette having been so perfected as the result of experiments, as to reduce to a negligible quantity the generation of hydrogen sulphide. It was stated that as the result of a long series of experiments it has been found possible by properly proportioning the raw material to make antimony sulphurette without creating any objectionable conditions and that this improved method has been in use at the States Metals Co. plant since the last week in October, 1916.

Although these claims appeared to be at least largely substantiated by the investigation it was learned from interviews had with a number of persons living in the vicinity of the works that whereas the choking effect produced by such vapors or gases as would result from the manufacture of sulphate of manganese had not been noticed for a long time, objectionable odors of hydrogen sulphide had been noticed a number of times since November 1, 1916, but not as often as previously. Whereas it would appear, therefore, that there is a doubt that the complete elimination of the hydrogen sulphide has been effected there is every reason to believe from our invstigation that it is largely if not entirely controllable and that during the time of the recent inspection it appeared to be entirely under control and was not escaping outside of the building in noticeable quantities.

Should, however, this company be unable to control the escape of this gas and thus abate a nusiance which has existed and has been complained of steps should be taken by the States Metals Company to absorb this gas which can in all probability be done at a reasonable expense. It is not likely, however, that this can be done satisfactorily by means of the type of scrubbers formerly used by this company inasmuch as hydrogen sulphide is only moderately soluble in water. In all probability the gas can be satisfactorily cared for in properly constructed absorption towers or scrubbers charged with lime inasmuch as hydrogen sulphide is rapidly absorbed by lime forming calcium hydrosulphide and water according to the following equation: $CaH_2O_2\ 2\ H_2S = CaH_2S\ 2\ H_2O$. Hydrogen sulphide is also decomposed by ferric hydronide with the formation of ferrous sulphide and water and the deposition of sulphur. The hydrogen sulphide liberated from the waste water from the antimony sulphurette filters, while not given off in any considerable volume, could also in all probability, be largely eliminated by providing a closed discharge pipe for the pump connected with the filters instead of allowing the waste liquid which is saturated with gas to splash onto and run over the floor into the sewer. If this should give rise to any objectionable conditions in the sewer another method would, of course, have to be worked out for the treatment of the gas escaping from this source.

In conclusion I would state that it appears from the investigation that although in all probability a serious nuisance was created in the past due to the character of the material manufactured and to the methods of operation, the nuisance has been remedied to a large extent owing not only to the

fact that the manufacture of all but one of the chemicals formerly made at this plant has been discontinued but also to improvements in the process of manufacture of antimony sulphurette, the only chemical now made at these works. The nuisance has not been entirely abated, however, since it would appear that hydrogen sulphide has been permitted to escape from the works at times since the process of manufacture was improved about November 1, 1916. It is believed, however, that the escape of this gas is controllable and can be prevented from escaping from the works by means of the improvements recently made with the most careful operation or at least by the introduction of scrubbers or absorption towers if these are found to be necessary.

In view of the foregoing conclusions I would recommend, therefore, that copies of this report be sent to the States Metals Company and to the Commissioner of Public Safety and that the States Metals Company be notified to take such immediate steps as may be necessary to permanently prevent the escape of gases and odors from their chemical works at Binghamton. If effective steps are not taken by the States Metals Company to permanently prevent the emanation of gases and odors from their works, I would further recommend that action be taken by you under the Public Health Law to enforce this requirement.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 8, 1917

In addition to the inspection described in the foregoing report, subsequent inspections were made at various times. Improvements, recommended by this Department, were made in the equipment and operation of the plant and since the installation of this equipment this Department has never been able to find, in repeated investigations, gases, escaping from this plant in such a manner as to create a public nuisance.

ILION

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon an investigation of an alleged nuisance in the village of Ilion, caused by the operation of the Warren Brothers Bitulithic plant. The investigation was made on November 7, 1917, by Mr. A. I. Howd, inspector engineer in this Department, in company with Dr. Frank B. Conterman, health officer of the village of Ilion.

The alleged nuisance was first brought to the attention of this Department on October 13, 1917, when a petition was received signed by some 36 residents of the village of Ilion, who live nearest to the plant, for the removal of the Warren Brothers Bitulithic plant from within the corporation limits of the village of Ilion. It was alleged that when the plant is in operation, large quantities of stone dust are produced by the grinding of stone, or some other process in the operation of the plant, and that the stone dust is blown onto and into the houses nearby in such a manner as to be injurious to property and health.

The Warren Brothers Bitulithic plant was originally located and operated in the Remington Typewriter Company's yards near East River street during the years of 1912 and 1913. It is stated that at that time the nearest residence to the plant was some 200 feet distant. Considerable nuisance was then

caused by the stone dust blowing into nearby houses and numerous complaints were made to the Warren Brothers Company. As a result of one of these complaints, it is alleged that the company gave a Mrs. Fessman a sum of money to cover the expense of painting her house. In the fall of 1913 the plant was removed to its present location, which is about 1,000 feet northeast of its former location. The nearest residences at present are about 1,500 feet south and west of the plant on East River street, there being no residences north or east of the plant for a considerable distance.

The apparatus used in the operation of the plant consists of mechanical stone conveyors, heating tanks for stone, screening and mixing apparatus, and heating tanks for tar. The method of operation of the plant is briefly as follows: Crushed stone or sand is shovelled into the mechanical endless conveyors which carry and dump it into 2 large heating tanks. The stone or sand falls from the heating tanks into another set of endless conveyors which carry it up 20 or 30 feet to the screening shed. The stone is screened, then mixed with sand and hot tar.

A dust collector was installed at the plant during the summer of 1917 as a result of continued complaints being received by the company. This collector consists of a pipe on top of the heating tanks through which the dust from the tanks is drawn by suction and blown into a tank where the dust is sprayed with steam and water. The dust is deposited on the ground under the tank and the steam escapes at the top.

There were two places in the plant at which considerable quantities of dust were evidently being produced and disseminated. One place was at the point where the stone and sand leave the heating tanks and fall into the conveyors. A second place and the one which seemed to produce the largest quantity of dust was in the screening shed. On the day of the inspection a strong west wind was blowing the dust, as it issued from this shed, for some 2,500 feet or more from the plant and away from the houses. If the wind had been blowing in the opposite direction the dust could have reached and caused considerable nuisance to probably 50 or more houses in this vicinity of Ilion.

The inspector visited several houses in the district affected by the stone dust and interviewed the residents. In each case the substance of the complaint was practically the same, namely, that when the plant is in operation and the wind blows toward their houses, large quantities of stone dust cover their porches, windows, furniture and clothing, and destroy their plants and shrubbery. They claim that the dust is so offensive that they cannot sit on their porches during the summer and they cannot have the windows in their houses open.

As a result of this inspection it is evident that the operations of the Warren Brothers Bitulithic plant at Ilion under its present methods and conditions, causes stone dust to escape from the plant in such quantities as to cause conditions of nuisance affecting a considerable number of persons.

I, therefore, recommend that a copy of this report be sent to the Warren Brothers Bitulithic Company and that they be advised to take immediate steps to prevent the escape of stone dust from their plant at Ilion in any noticeable quantities.

I also recommend that a copy of this report be sent to the local Board of Health.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *November* 21, 1917

Copies of this report were sent to the local board of health and to the Warren Brothers Co. on Nov. 26, 1917, urging that they carry out the recommendations of this report.

Subsequently the Department was informed that the Company would proceed to rectify the conditions of nuisance.

KINGSTON

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on our investigation of the operation of the rendering plant of Roach Brothers at Kingston, made at your direction and as the result of a complaint from a property owner of the city.

The investigation was made by Mr. C. A. Holmquist, assistant engineer in this Department, in company with Mrs. H. V. Michael, Chairman of the Sanitary Committee of the Health Commission of the city; and Mr. Fred Dressell, plumbing and sanitary inspector of the city on November 27, 1917. Mayor Palmer Canfield, Jr.; Dr. A. S. Vrooman, health officer of Kingston, and a number of persons living in the vicinity of the plant were interviewed.

The rendering plant of Roach Brothers of which Mr. William A. Roach is president, is located in the northern section of Kingston at 38 Ann street between Meadow and Union streets, one block east of Broadway, a thickly settled section of the city. It has been located at the present site since 1887. Roach Brothers render meat market and slaughter wastes but no dead animals at this rendering plant. Hides are also bought, salted and stored by them at this plant. The plant is equipped with a new rendering kettle of the direct steam type, 3 feet in diameter and about 10 feet high installed about October 1, 1917; one old abandoned rendering kettle also of the direct steam type; a steam boiler and a hand operated hydraulic press. It was learned that the old kettle had leaked badly allowing steam and odors to escape into the atmosphere giving rise to very objectionable conditions and that it was, therefore, abandoned and a new kettle installed.

Process of operation

There appeared to be no objectionable odors created in the handling and storing of the green hides. The hides are brought in from slaughter houses and are salted and stored until a sufficient quantity accumulates to make a shipment. In connection with the rendering process it was learned that meat market and slaughter house wastes are collected every day and stored in barrels and other receptacles until rendered. The wastes stored in the plant at the time of the inspection appeared to be fairly fresh and did not give off any objectionable odors that could be detected outside of the plant. It was claimed that the wastes amounting to about 1,200 pounds per day are rendered every other day so that none of the wastes are more than 2 days old any time before they are cared for. The process of operation is briefly as follows:

The wastes are elevated to the second floor of the plant and emptied into the rendering kettle through a manhole which is then hermetically sealed. Steam under a pressure of about 50 pounds is then turned on for a period of from 5 to 6 hours or until the material is thoroughly cooked. The vapors and gases generated in the process of rendering is conveyed through pipes to a vacuum pump condenser which discharges into the city sewer system. Although the pump leaked considerably no objectionable odors were detected from this source at the time of the inspection.

After the steam is turned off the kettle is allowed to stand closed until the following morning when the liquid in the kettle is drawn off and discharged into the sewer. The oil or tallow is then drawn off and placed in barrels ready for shipment. The solid contents of the kettle called tankage is removed through a rectangular manhole located near the bottom of the kettle. The tankage is then pressed in a hand operated hydraulic press to remove as much of the residual oil and moisture as possible. This tankage after having the oil and moisture removed from it is stored in a storage and drying room on the second floor of the plant until a sufficient quantity to fill a box car has accumulated. Lime is applied to the tankage in the storage and drying room presumably for the purpose of preventing or retarding putrefaction and the escape of objectionable odors.

Odors

It was found at the time of the inspection that objectionable odors were given off from a number of sources among which the following were the more noticeable: the storage and drying room; the raw material; the cans and barrels in which the raw material is stored prior to rendering; the floors of the press room and the tankage press. The doors of the storage and drying room were open at the time of the inspection thereby allowing the odors from this room to escape into the atmosphere. Keeping the doors closed would confine the odors and prevent them from escaping in any considerable volume and would, in all probability, reduce the odors from this source considerably.

The odors from the floors and from the barrels and containers in which the raw wastes are stored could be eliminated largely, if not wholly, by keeping the floors cleaned and by thoroughly cleaning the containers as soon as they are emptied. The odors from the tankage press could be reduced to a large extent by allowing the kettle to cool as long as practicable before dumping and also by confining the tankage as much as possible.

Steps should also be taken to repair the pump which is operated in connection with the condenser and which was found to be leaking badly at the time of the inspection. If this pump should break down and thereby interfere with the operation of the condenser a serious nuisance would, in all probability, be created due to the escape of uncondensed odors and vapors from the rendering kettle during the process of cooking.

The local authorities stated that no complaints against the operation of this plant have been received since the new kettle was installed about 2 months ago and it was learned from the persons living in the vicinity that the conditions have been greatly improved since last summer. It would seem, therefore, that the old leaky kettle was the chief source of the objectionable odors complained of.

Conclusions and recommendations

In conclusion I would state that it was found from the recent investigation that although the nuisance complained of had been largely abated by the installation of the new rendering kettle, objectionable odors still escape from portions of the plant which under certain meteorological conditions might create a nuisance in the thickly settled section of the city in which the plant is located. It is important, therefore, that the plant should be operated with care and efficiency and that the floors and equipment should be maintained in as cleanly and sanitary condition as possible.

In view of the above the following recommendations are made:

1. That the tankage in the kettles be allowed to cool as long as practicable before the kettle is dumped.
2. That the doors of the storage and drying room be kept closed.
3. That the raw material be rendered as soon as possible after it is received at the plant and before it has an opportunity to decompose.
4. That the barrels and receptacles in which the raw material is received be thoroughly cleaned as soon as emptied.
5. That the floors be thoroughly cleaned daily and maintained in as cleanly and sanitary condition as possible.
6. That the pump operated in connection with the condenser be repaired.
7. That the old kettle be not used unless it is properly and thoroughly repaired.

I would also recommend that copies of this report be sent to the local board of health, to the complainant and to Roach Brothers, and that the local board of health be requested to require that the above recommendations be carried out.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

ALBANY, N. Y., *December* 14, 1917

Copies of this report were transmitted to the local board of health, the complainant, and Roach Bros.

NEWARK

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an investigation of the alleged nuisance caused by the discharge into the atmosphere of fumes and gases from the chemical works of the Commonwealth Chemical Corporation at Newark, Oneida county, made at your direction and as the result of complaints from the village.

The inspection was made by Mr. C. A. Holmquist on July 16, 1917, in company with Dr. A. A. Young, health officer of the village and Mr. K. V. Stockelbach, manager of the chemical works. A number of residents of the village were also interviewed at the time of the inspection.

The chemical works of the Commonwealth Chemical Corporation of which Mr. F. E. Stockelbach of Hoboken, N. J., is president and Mr. K. V. Stockelbach is manager, is situated in the southern part of the village of Newark between Hoffman street and the Northern Central railroad. The village is nearly fully developed for residential purposes on the northerly and westerly sides of the works and the New York State Custodial Asylum is located on high ground east of the plant. The property of this institution is only some 200 feet from the plant and a number of the buildings of the institution are situated on a hill a few hundred feet east of the chemical works.

The Commonwealth Chemical Corporation is engaged in the manufacture of benzoic acid and benzaldehyde by the synthetic process from toluol at their Newark works which were put in operation in November, 1916. In addition to toluol, liquid chlorine, hydrochloric acid, sulphuric acid, lime and bicarbonate of soda are used in the process. Although chemical vapors and gases are given off at a number of stages in the process of operation the more objectionable gases are those given off from three operations, namely, (1) at the beginning of the process during the chlorination of the toluol which occupies a period of about 22 hours out of 24 hours each day; (2) when the hydrochloric acid is added and (3) during the boiling and dissolving of the product in the soda ash solution.

It was learned from the manager of the chemical works that some 1,000 pounds of hydrochloric acid in the form of gaseous vapors and some 20 pounds of free uncombined chlorine gas are given off per day during the chlorination of the toluol. These gases it was claimed were discharged directly into the atmosphere during the first two or three months of the operation of the chemical works. Since that time a number of devices comprising absorption and scrubbing towers have been installed but all of them with the possible exception of the one put in operation two or three days before the time of the inspection, have proved unsuccessful due largely to the difficulty of disposing of the solutions of hydrochloric acid and chlorine resulting from the operation of the absorption or scrubbing towers. Owing to the large quantity of hydrochloric acid in the wastes from the absorption tower the village authorities have properly refused the company permission to discharge these wastes into the sewer system tributary to the village sewage disposal plant and the cesspools installed by the company for the disposal of these wastes have proved unsuccessful and have overflowed due to the low and impervious nature of the soil at and near the works.

The last scrubbing and absorption tower which was constructed and put in operation a few days before the time of the inspection appeared to operate satisfactorily and to absorb practically all, if not all, of the hydrochloric acid vapors and chlorine gas given off by the process. This scrubber consists of 2 vertical pipes 16 feet high constructed of 4-inch vitrified tile pipes with cemented joints. The pipes are filled with coke. The tops of these 2 pipes

are connected with another central vertical 4-inch vitrified pipe, 8 feet long, also filled with coke. The gases given off from the chlorination process are admitted near the bottom of the 2 16-feet pipes and water is admitted near the tops of these pipes and allowed to trickle over the coke and absorb the gas as it passes upward through the coke. A solution of caustic soda is admitted at the top of the 8-feet pipe for the purpose of absorbing any of the gases more particularly the chlorine gas not taken up or absorbed by the water in the 16-feet pipes. Chlorine is only moderately soluble in water, whereas water absorbs about one-third its volume of hydrochloric acid. The absorption of the gases appeared to be complete inasmuch as no gases could be detected at the top of the absorption tower at the time of the inspection. The water coming from the tower is discharged into a line of subsurface irrigation tile about 75 feet long. This system had only been in operation for a few days so that it was impracticable to determine if it will continue to care for the wastes from the scrubber. The soil in which the subsurface tiling is laid consists of sand which should satisfactorily absorb a considerable quantity of the wastes. A limited area appeared to be available near the works for the laying of additional lines of tile, if necessary, to take care of these wastes.

The addition of hydrochloric acid to the product in the process of the manufacture of benzoic acid takes place in a vat outside of the building and results in the evolution of voluminous vapors of benzoic acid which continues for about 15 minutes during the day. These vapors are of a very stifling nature but could not be noticed at a distance of more than 100 feet from the vat. Owing to the atmospheric condition it was impracticable to determine how far these vapors would carry but it did not seem probable that they could be noticed more than 200 or 300 feet from the plant.

Voluminous vapors having a peculiar sweetish and astringent odor of almond are given off for a period of about 2 hours each day when the product is boiled and dissolved in a soda-ash solution. These odors caused a smarting of the eyes at a distance of about 100 feet from the plant. Although the odors themselves could not be detected at a distance of more than 100 feet from the plant at the time of the inspection the Health Officer stated that he had noticed them at his residence about one-half mile from the works.

No attempt has been made by the company to absorb or condense the vapors just referred to. It would appear, however, and the manager of the works admitted, that it would be possible although somewhat expensive, to absorb or condense these vapors by the installation of a still. He stated, however, that it would be impracticable if not impossible, to condense or absorb the vapors and benzoic acid gases given off when the hydrochloric acid gas is added in the process of manufacture of benzoic acid.

In conclusion I would state that it appeared from the investigation and from the information obtained from persons interviewed at the time of the inspection that although a serious nuisance has been created due to the gases given off in the process of manufacture of benzoic acid at this plant, the most serious nature of the nuisance has been remedied to a large extent by the installation of a scrubbing tower for the absorption of the hydrochloric acid and chlorine gases which comprise the most voluminous, objectionable and dangerous of the gases generated.

The successful operation of the absorption tower for the absorption of these gases appears in this case to depend largely upon the successful disposal of the wastes from the tower. If it is found, therefore, that these wastes cannot be disposed of by means of cesspools or subsurface irrigation at or near the chemical works some other means for the absorption or the elimination of gases of hydrochloric acid and uncombined chlorine should be devised or consideration should be given to moving the chemical works to some site farther removed from the New York State Asylum and the developed section of the village inasmuch as the continuous discharge into the atmosphere of such large volumes of these dangerous gases as are generated at the chemical works would not only endanger the health and safety of a large number of residents of the village but also of the 900 wards of the State at the Custodial Asylum located only a few hundred feet east of the works in the direction of the prevailing winds.

Objectionable conditions are also created by the discharge of gases and vapors from two other of the processes of manufacture, namely the boiling of a product in soda ash and the addition of hydrochloric acid. It would appear, however, that the gases generated by the boiling of the product in soda ash can in all probability, be eliminated and that although it may be difficult it should not be impossible to eliminate also the gases generated from the addition of hydrochloric acid.

In view of the foregoing conclusions I would recommend, therefore, that copies of this report be sent to the local Board of Health and to the Commonwealth Chemical Corporation and that this corporation be notified to take such immediate steps as may be necessary to prevent the escape of gases and odors from their chemical plant at Newark. If effective steps are not taken by this corporation to permanently prevent the escape of gases and odors more particularly the hydrochloric acid and the chlorine gases from their works, I would further recommend that action be taken by you under the Public Health Law to enforce these requirements.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July* 25, 1917

Copies of this report were sent to the local board of health and to the Commonwealth Chemical Corporation, urging that immediate action be taken to rectify the objectionable conditions.

SENECA FALLS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to report as follows on an investigation of insanitary conditions in the village of Seneca Falls, Seneca county, arising from the raising of the canal level through the village in the construction of the Barge canal. The inspection was made on April 18 by Mr. H. B. Cleveland, principal assistant engineer in this Department. Mr. Cleveland was accompanied on the inspection by Village President Wessell, Senior Assistant Engineer Smith of the Barge canal office, Village Engineer Sidney S. Smith, Dr. Robert Knight, health officer, and Village Clerk Combs.

The matter was first brought to the attention of this Department on March 7, 1917, in a communication from the village clerk, Mr. Charles W. Combs, transmitting the following resolution adopted by the village board of health on March 5.

> Whereas, The State of New York in constructing the improved Cayuga and Seneca canal through this village has caused a large pool to form in the area bounded by West Bayard, Center and Ovid streets; and
>
> Whereas, Said pool is stagnant and gives forth offensive odors and has been and will be a menace to public health; and
>
> Whereas, The water from this pool finds its way into the sanitary sewer system of the village at a considerable damage and detriment thereto, be it
>
> Resolved, That it is the sense of this board that the State should fill in this area as was originally planned and that the clerk be and he hereby is instructed to forward a copy of this resolution to the state engineer and the chief engineer of the division of sanitary engineers at Albany, N. Y.

The matter was also referred to the Department on March 7 by Dr. F. W. Sears, sanitary supervisor, who had received a communication in reference to this question from Dr. Robert Knight, health officer of the village, in which it was stated that the pond created by the Barge canal construction was

leaking into the sewers and interfering with the proper drainage of the village. Dr. Sears stated that the village authorities thought the State should look after the matter.

The question of remedial action was thereafter referred by this Department to the Hon. W. W. Wotherspoon, State Superintendent of Public Works, on the ground that jurisdiction in the case was lodged with him, and he was asked to take such measures as were within his power to correct the conditions complained of if after investigation the facts were found to be as stated.

On April 9, a communication was received from Chief Clerk R. G. Finch of the State Engineer's office referring to the resolution passed by the board of health of the village and appearing above and stating that as a result of an examination by the State Engineer's Department, it would appear that the slope along a small section of the pool impounded by the Barge canal construction is very flat so that fluctuations of pool level for about 1 foot will expose a strip of land having a width of about 20 feet. It was further stated in this communication that the condition described would be remedied by depositing material in the location, thus providing a steeper slope, but that to fill in the entire area in question would involve the handling of approximately 50,000 cubic yards of material at heavy expenditure.

In this communication it was stated that, before any report was made by the State Engineer's office to the Superintendent of Public Works on the question involved, or taking the necessary steps to perform any work of the nature suggested in the resolution of the local board of health, the State Engineer desired to obtain from this Department an expression of opinion as to whether or not this Department considered that an insanitary condition exists due to the construction of the Barge canal, and if so, what recommendations would be made by this Department as to the proper methods to be pursued in abating the nuisance.

Seneca Falls is an incorporated village in the northeasterly portion of Seneca county lying about 2 miles westerly from the northerly end of Cayuga lake. The village is situated on Seneca river, the outlet of Seneca lake, and is 3 miles east of Waterloo and 10 miles east of the city of Geneva, which is located at the foot of Seneca lake. The Auburn division of the New York Central and Hudson River Railroad and the Seneca Falls branch of the Lehigh Valley Railroad pass through the village.

The population of Seneca Falls, according to the 1915 State census, is about 7,000. The public water supply is under the control of the municipal authorities and is derived from Cayuga lake, the supply being filtered in mechanical pressure filters.

The sewer system was constructed in 1908 and 1909 under plans approved in 1904 (the disposal plant being built under plans approved by this Department on August 21, 1908), and consists of 20 miles of sanitary sewers, 6 inches to 24 inches in diameter. The sewage before its discharge into the Seneca river is treated in a sewage disposal plant consisting of a screen, a 3-compartment grit chamber, a 3-compartment settling tank and a sludge bed.

The main outfall sewer of the village sewer system leading to the disposal plant extends from Ovid street easterly along the southerly and easterly banks of the canalized river. This sewer is 24 inches in diameter and was reconstructed of castiron pipe by the State at the time of the construction of the Barge canal in view of the fact that the water level in the canal was so raised as to submerge this pipe line. A lateral trunk line 10 inches in diameter extends from a manhole 75 feet west of Ovid street on this main trunk sewer up the valley of a small stream entering the canal a short distance west of Ovid street and after crossing West Bayard street divides into two 8-inch branches, one extending easterly along an easterly branch of this stream across Ovid street and Garden street and one extending westerly along the westerly branch of the stream across Center, Bridge, Swaby and Toledo streets. It is over the upper portion of this lateral trunk sewer and the lower portions of its two branches, between West Bayard street on the north, Ovid street on the east and Center street on the west, that the pool referred to in the resolution of the local board of health is formed by the backing up of water from the Barge canal through the culvert under West Bayard street.

The level of the canal below the old lock in Seneca Falls at the mouth of the stream passing under West Bayard street has been raised approximately 14 feet. It was stated by the village engineer that the decision to raise the canal level to its present elevation at this point was made subsequent to the construction of the lateral trunk sewers south of West Bayard street described above.

This raising of the canal level has resulted in the formation of a pond 3 or 4 acres in extent and with a maximum depth of 10 to 12 feet in the center of the block bounded by West Bayard street on the north, by Ovid street on the east, by a short street connecting Ovid and Center streets on the south and by Center street on the west. Along the two branches of the stream, which formerly flowed through the center of this area, when the canal is at maximum level, the water backs through the culvert under Ovid street on the east and through the culverts under Center and Bridge streets on the west. The drainage area of the east or larger branch of this stream is approximately 2.8 square miles and the drainage area of the west branch is approximately 1.8 square miles, the total tributary drainage area being 4.6 square miles. The flow in each stream at the time of inspection amounted to a mere trickle, and it was agreed by the engineers and village officials present that during the summer, except in times of rainfall, these streams are entirely dry.

The general elevation of the streets bounding the block in which the pool or pond is located is 25 to 30 feet higher than the bed of the pond and 15 to 20 feet higher than the surface of the water in the pond. No effect, therefore, in the drainage conditions in cellars or on any wells in the vicinity is produced by the ponding of this water. Furthermore, the banks are rather steep, except along the streams east of Ovid street, and particularly along the stream west of Center and Bridge streets, and the fluctuation of 1 foot in canal level produced by the use of the water in the canal for power generation at Waterloo does not cause objectionable conditions from intermittent flooding of lands except in the case of the small areas adjacent to the streams as described.

The only effects which might possibly have any sanitary significance arising out of the changes in water level incident to canal construction at this point are, first, the creation of the stagnant pool of water referred to near the center of the village; and, second, the infiltration of ground water into the trunk sewers in question.

Respecting the formation of a stagnant pond of water resulting from the raising of the canal level, it is apparent that, with no flow into this pond from the two branches of the stream during the greater portion of the summer season, and with the only renewal of the water in the pond consisting of the volume alternately backing up and flowing out through the culvert under West Bayard street, corresponding to the fluctuation of about one foot, insanitary conditions, due to mosquito breeding and the creation of objectionable odors, will undoubtedly be created in warm weather if the pond is not eliminated by filling in or unless the shores and bottom are so improved and other measures taken to prevent aquatic growths and mosquito breeding.

Respecting the surcharging of the trunk sewer, it was found that the 10-inch lateral trunk sewer near the point where it enters the main 24-inch trunk was flowing full under pressure, the sewage and water rising in the manhole a few inches above the crown of the inlet sewer. This sewer is 17 feet below the water level in the canal at its lower end and about 10 feet below the pond surface at its upper end, where the two 8-inch branches discharge into it. There is a manhole at this latter point and two manholes on the 8-inch branch to the east rising 6 or 8 feet above the water surface of the pond. Two of these manholes had a decided list, indicating possible breaks in the sewer line near them. These sewers were laid with cement joints below but not in the bed of the stream and are obviously, from the conditions found, in a leaky condition.

An inspection of the sewage disposal works of the village was made by one of the engineers of the Department on December 2, 1914, about one year before the canal prism at this point was filled with water. On the day of the inspection it was determined that the approximate daily flow of sewage reaching

the disposal plant was 291,000 gallons, equivalent to a per capita flow of 93 gallons per day per person served by the disposal works, and it was concluded that very little ground water or trade wastes were received at the disposal works at that time. The population tributary to the works then was about 3,120, only about 60 per cent of the total population of the village at that time, namely, 6,500, being served by the sewer system, and the sewage from approximately 800, discharging into the Elm street sewer, was not reaching the disposal plant owing to faulty construction of this sewer.

The three compartments of the settling tank are each 98 feet long, 10½ feet wide and 7 feet 8 inches deep, giving a total capacity for the three tanks of about 160,000 gallons. This capacity allowed a detention of about 13 hours in 1914.

The additional ground water now reaching the disposal works by reason of the submerged and leaky condition of the lateral trunk sewers south of West Bayard street, allowing only for the full flowing capacity of the 10-inch trunk on a gradient of 0.6 per cent and not allowing for the fact that this sewer is flowing under some pressure, is 1,000,000 gallons daily.

The condition now existing therefore with respect to ground water infiltration into the sewers and with respect to the capacity of the settling tanks to treat the sewage is as follows:

Whereas, prior to the raising of the canal level, practically no ground water infiltration occurred, the amount of sewage reaching the plant was 291,000 gallons daily and the settling tank capacity allowed a detention of about 13 hours with less than half the population being served by the sewer system, at the present time, with the canal level raised, the lateral trunk sewers south of West Bayard street are surcharged with ground water, the amount of sewage and unfiltered ground water reaching the plant is in excess of 1,200,000 gallons and the time of detention in the settling tank, designed on a basis of 8 hours' detention for 5,500 persons, is but little more than 3 hours with probably less than 4,000 persons served by the sewer system. In other words, the excess ground water infiltration into the sewer system and reaching the disposal plant amounts to about one and one-third times the normal sewage contribution from the entire present population of the village.

From the above it may be concluded that the construction of the Barge canal through Seneca Falls has through the raising of the ground water level created a pool of water which unless properly improved and maintained will, in all probability give rise to odors and the propagation of mosquitoes and through leakage has seriously interfered with the proper operation of the village sewer system and sewage disposal works.

These conditions may, however, be remedied, at least in part, in the following ways:

1. The pond south of West Bayard street may be filled in with earth, proper provisions being made for a creek channel and thus do away with the present opportunities for mosquito breeding and the growth of algæ in and along the shores of the pond and reduce in a large measure the infiltration of water into the lateral trunk sewers; or
2. The trunk sewers may be reconstructed of castiron pipe with caulked joints to effectively prevent any infiltration of water into these sewers, and the bed and shores of the pond so improved as to eliminate all shallow portions and provide clean sharply sloped banks, thus eliminating mosquito breeding places.

Of these two methods the latter will be by far the more certain to prevent the infiltration of water into the lateral trunk sewers, although for the suppression of mosquitoes and the prevention of odors from algæ growth during the summer it may be necessary to treat the pond occasionally with copper sulphate and crude oil.

In conclusion I would recommend that copies of the report be transmitted to the State Engineer and to the village authorities.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 29, 1917

Copies of this report were transmitted to the State Engineer and to the village authorities.

WHITE PLAINS

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report of our investigation of alleged insanitary conditions of the Bronx river and Hunt's brook at White Plains, with special reference to the breeding of mosquitoes.

A complaint in the form of a petition signed by some 26 residents of White Plains, was made to the Governor under date of August 13, 1917, in which it was alleged that insanitary conditions exist along the Bronx river and Hunt's brook, due to its stagnant condition, and, as a result, "the river and brook in their present repulsive condition breed mosquitoes and cause malaria, to the great discomfort and ill-health of the population in the neighborhood and constitute a nuisance." A complaint of the insanitary condition of Hunt's brook was also made to this Department by a resident of the town of Greenburg. The petition to the Governor was referred to this Department on August 25 and an inspection of the Bronx river and of Hunt's brook was made by Mr. C. A. Holmquist, assistant engineer in this Department in company with Dr. LeRoy W. Hubbard, sanitary supervisor of that district, Dr. E. G. Ramsdell, health officer of White Plains and Mr. Geo. R. Hilty, assistant secretary of the Bronx parkway commission. The commissioner of public works of White Plains, one of the members of the common council of the city, the principal assistant engineer of the Bronx parkway commission and most of the signers of the petition to the Governor were interviewed.

The Bronx river from Bronx park in New York city to the Kensico reservoir at Valhalla, a distance of about 15 miles, is included in the Bronx parkway reservation, which consists of a narrow strip of land having an average width of some 1,000 feet along the river. The land for the reservation is being acquired and improved jointly by New York city and the county of Westchester under the administration of three commissioners known as the Bronx parkway commission.

The improvements carried out by this commission consist largely of building driveways along the river; cleaning, straightening and improving the channel of the river; constructing and maintaining swimming pools; eliminating pollution of the river and tributaries; removing objectionable structures and buildings within the reservation; building bridges; and cutting down weeds and underbrush along the stream. Although considerable development work has been done north of White Plains, the greater portion of the work has been confined to the section south of White Plains. The improvements in the northern section of the reservation are being carried out as fast as land can be acquired.

Our inspection discloses that a section of the river for a distance of about one-half mile north of Hamilton avenue, in White Plains has been subject to backwater for about a year, due to the construction of the Hamilton avenue, concrete bridge which is now nearing completion. The old channel of the river at this point was on the line of the westerly abutment of the new bridge and in the construction of this abutment a dam was constructed across the stream at this place and a narrow channel for diverting the flow of the river was dug under the span of the new bridge west of the westerly abutment. This channel appeared to have been inadequate and too high to care for the flow of the stream so that the water level in the river at this point was raised some 3 or 4 feet, causing the water to overflow the low banks of the stream and spread over the low area north of Hamilton avenue, and more particularly north of Hopkins avenue, near the mouth of Hunt's and McLean brooks tributary to the river.

It was learned that the high water conditions of the river existed until the later par of July of this year, when the new channel under the Hamilton

avenue bridge was widened and deepened. This new channel, however, is still obstructed somewhat by what seems to be an unnecessary dam, causing backwater in the river above the bridge.

The high water conditions of the Bronx river caused by the temporary damming of the stream at the Hamilton avenue bridge flooded a considerable area of rather low swamp land above Hamilton avenue, and more especially above Hopkins avenue. This area is covered with cattails and flag and other aquatic growths, thus creating and maintaining mosquito breeding places and places for the harboring of mosquitoes during the day. It was alleged that mosquitoes and malaria were much more prevalent during the past summer in the section of White Plains above the Hamilton avenue bridge than during previous years, and these conditions were attributed to the unusually high water in the river above the Hamilton avenue bridge.

It was learned from the Bronx park commission that steps had been taken to improve the conditions along this river, and a contract has been made for straightening and deepening the channel of the river, or for the building of a new channel from the Main street bridge, just south of Hamilton avenue, to a point near Hopkins avenue, a distance of about 1,500 feet. This improvement will lower the level of the river at Hamilton avenue nearly 4 feet and should drain the low swampy area above this point. It was also learned that a number of lakes, to be used as bathing and wading pools, are to be formed between White Plains and Valhalla.

It is important that the existing channel above the Main street bridge, which is to be abandoned when the new channel is completed, should be so filled as to leave no stagnant pools which might form mosquito breeding places. Special precautions should also be taken by the Bronx parkway commission in making the proposed river improvements and in forming lakes to remove the cattails and flag and other aquatic growths from the sides of the stream and the edges and bottom of lakes formed in order to destroy, as far as possible, all mosquito breeding places and prevent the establishment of such places. The banks of the stream should be sharp and clean and the lakes or pools should be as free from vegetation as possible.

Hunt's brook, against which complaint was made, is a small stream which rises in the town of Greenburg, west of White Plains, and flows in a northeasterly direction, discharging into the Bronx river, about one-half mile north of the Main street bridge in White Plains. It forms the boundary line between the city of White Plains and the town of Greenburg for a distance of about one mile above its confluence with the Bronx river. It is the existing condition of this lower section of the brook and more particularly that portion of the brook above and below the Central avenue and the Tarrytown road highway bridge, against which complaint was made.

Above the Tarrytown road bridge the brook flows through the back yards of the tenement houses, located both on the White Plains and on the town of Greenburg margins of the stream. These tenements are occupied largely by Italians. Below the bridge it flows through pasture land owned by C. F. McLean.

The brook in this section is 2 or 3 feet wide and has a fairly rapid flow. There were no stagnant pools nor were there any evidences of mosquito larvæ. The flow of the stream was, however, obstructed somewhat both above and below the Tarrytown road bridge by debris such as tin cans, old bottles, parts of old iron bedsteads, etc., which have been thrown into it presumably from the houses back of which it flows. No garbage or other putrescible matter was found in the stream.

Although the conditions of the brook could hardly be said to constitute a nuisance detrimental to health, it was nevertheless unsightly and objectionable and constitutes a public nuisance, and immediate steps should be taken to have the brook cleaned and to have any pollution found to exist removed. Signs should also be posted along the brook prohibiting the discharge of refuse into it. Inasmuch as this portion of the brook forms the boundary line between the city of White Plains and town of Greenburg, the cleaning of the brook requires the joint action of the boards of health of these two municipalities.

In conclusion I would state that it appears from the investigation that mosquitoes had been unusually prevalent; that there have been a number of cases of malaria in the sections of the city of White Plains along the Bronx river above the Main street bridge during the past summer. These conditions have, in all probability been due to the high water conditions in the river and the flooding of low lands by the back water caused by the temporary dam across the river at Hamilton avenue bridge. These conditions should be effectually remedied by the proposed straightening and deepening of the Bronx river in this section.

The throwing of refuse into Hunt's brook created objectionable conditions and a nuisance which should be remedied with as little delay as possible, and immediate steps should be taken by the boards of health of the city of White Plains and the town of Greenburg to have the brook cleaned and signs posted prohibiting the discharge of refuse.

I therefore recommend that copies of this report be sent to the local board of health, to the Bronx valley sewer commission, and to the complainants, and that the local authorities be urged to at once follow out the suggestions for improvements in conditions outlined in this report.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 19, 1917

Copies of this report were sent to the various parties noted above, urging that they carry out the recommendations of the report.

In addition to the foregoing, inspections were made and reports transmitted to local authorities or advice was given by correspondence in the matter of abatement of nuisances at the following places:

Andes (Town)
Brighton (Town)
Cheektowaga (Town)
Flackville
Hunter
Lisbon (Town)
Long Beach
Mamaroneck (Town)
Monticello
Naples
Ossining
Port Chester
Shushan
Spencer
Stony Point
Tuckahoe
Unadilla
Valhalla
Wallkill (Town)
Walworth (Town)
Watervliet

SPECIAL INVESTIGATIONS

INVESTIGATION OF MILK PASTEURIZING PLANTS

The investigation of the sanitary condition and operating efficiency of milk pasteurizing plants throughout the State was undertaken in 1917 for the first time by the Engineering Division. Previous to this time little more than bacterial examination work had been carried on by this Department in connection with milk pasteurization although for a number of years plants shipping pasteurized milk to New York City have been under the supervision and inspection of the New York City Department of Health. At the beginning of the year, however, careful preparations were made to conduct a more comprehensive investigation of the milk pasteurizing plants throughout the State with special reference to the sanitary conditions at the plant, the type and adequacy of the apparatus used, the effectiveness of the methods and processes employed and the care taken to keep utensils and apparatus in sanitary condition. Up to the present the work of investigation has not included pasteurizing plants whose output is shipped, exclusively, to New York City.

In a comparatively small number of plants, at the beginning of the investigation, samples of raw and pasteurized milk were collected for bacterial analyses but as the investigation progressed it became evident that with the limited force available for the work, quicker and more effective results would be accomplished by confining the work largely to sanitary surveys of the various plants and inspections of the equipment and operation of these plants before extended analytical work should be undertaken.

Inspections were started in January and were carried on throughout the year. The inspections have been made principally by one of the engineers of the Department although during the fall several inspectors have been engaged in the work.

During the year full investigations were made of one hundred and twenty pasteurizing plants while some sixty plants have been reinvestigated. Following the original investigations recomendations for improvements in apparatus or in the operating con-

ditions and methods used, have been made to the owners and proprietors of the plants.

A rough classification of the one hundred and twenty plants inspected is as follows; ten were found to be of generally good sanitary construction, equipment and manner of operation; some twenty-five may be said to be of fair sanitary construction, equipment and operation; some forty were poorly constructed and poorly operated and some forty-five were found to be in a very unsatisfactory condition both with respect to construction and operation.

As a partial indication of the results of the work, the 60 plants of which reinvestigation was made may be roughly classified as follows: nineteen have either permanently or temporarily discontinued pasteurization; eleven have either been abandoned for new plants, completely reconstructed or have been so remodeled as to carry out all the recommendations made by the Department; at twenty plants some of the recommendations made have been carried out and the proprietors have shown a willingness to cooperate and carry out the remainder of the recommendations as soon as possible; at ten of the plants no steps have been taken to carry out the recommendations of the Department.

It is expected that original inspection will be completed of all the pasteurizing plants now in operation in the State during the early part of the coming year, the work thus far having covered generally the eastern half of the State east of Syracuse and a considerable number of the pasteurizing plants located in the city of Buffalo.

It will be noted from the summary of the results of the investigation as thus far carried on that definite and effective results are being acomplished and it is expected that the work will be continued and considerably extended during the coming year.

INVESTIGATION OF SANITARY CONDITION OF STATE INSTITUTIONS

In accordance with section 14 of the Public Health Law, as amended by Chapter 559 of the Laws of 1913, the examination and inspection of the sanitary conditions of State Institutions, commenced in 1914, has been continued this year.

These investigations comprise in all cases a careful inspection of the grounds, buildings and other features to determine the sanitary conditions with respect to water supply, sewerage, sewage disposal, plumbing, ventilation, garbage disposal, milk supply, etc. Twenty-eight institutions were investigated and reported upon and as required by law, copies of the reports and recommendations thereon transmitted to the institution authorities. The institutions investigated during the year are as follows:

Agricultural School

Farmingdale — State School of Agriculture

Charitable and Reformatory Institutions

Albion — Western House of Refuge for Women

Batavia — New York State School for the Blind

Bedford Hills — New York State Reformatory for Women

Hudson — New York State Training School for Girls

Newark — New York State Custodial Asylum for Feeble-Minded Women

New York City, Randall's Island — New York House of Refuge

Oxford — New York State Women's Relief Corps Home

Ray Brook — New York State Hospital for Incipient Pulmonary Tuberculosis

Rome — Rome State Custodial Asylum

Syracuse — Syracuse State Institution for Feeble-Minded Children

Thiells — Letchworth Village

West Haverstraw — State Hospital for Crippled and Deformed Children

State Hospitals for the Insane

Brooklyn — Brooklyn State Hospital
Buffalo — Buffalo State Hospital
Central Islip — Central Islip State Hospital
Gowanda — Gowanda State Hospital
Kings Park — Kings Park State Hospital
New York City — Manhattan State Hospital
Ogdensburg — St. Lawrence State Hospital
Utica — Utica State Hospital

Prisons and Hospitals for Insane Criminals

Auburn — Auburn State Prison
Auburn — Auburn State Prison Farm
Beacon — Matteawan State Hospital
Comstock — Great Meadow Prison
Dannemora — Clinton Prison and Dannemora State Hospital
Valatie — State Farm for Women

Other Institutions

Chester — Farm Colony for Women Offenders

Abstracts of the reports on the examination of the institutions will be found below:

AGRICULTURAL SCHOOLS

(Farmingdale) State School of Agriculture

The State School of Agriculture is located about 1½ miles north of the village of Farmingdale, Nassau county, N. Y., and on the boundary line between the town of Oyster Bay, Nassau county and the town of Babylon, Suffolk county. The institution owns about 308 acres of land. The central portion of this area is flat, the main drainage being from the hills in the northeastern part of the property toward the southwest. The ground surface drops sharply to the Amityville-Huntington Highway. The main buildings consist of the Agronomy building, the Horticulture building, the dormitory of the boys' group, the director's residence and the power house. In addition to this there are a number of barns, sheds and similar structures. The total population of the institution at the time of the inspection was 142.

An examination of the sanitary condition of the institution was made on March 26, 1917. As a result of this investigation it appeared that certain insanitary conditions existed and the report on the inspection contained the following conclusions and recommendations.

Conclusions and recommendations

1. That the recommendations of the report dated June 21, 1915 on the special investigation of the water supply made by this Department be carried out.

2. That the farm buildings be provided with adequate water supplies of safe sanitary quality.

3. That the disposal plant be operated more strictly in accordance with the directions provided by this Department under date of May 6, 1916.

4. That the use of privies be discontinued wherever possible. Where it is necessary to use a privy, I would recommend that it be located so that a water supply will not be polluted, that it be so constructed as to be inaccessible to flies and that it be maintained in a sanitary condition.

5. That all storm and surface water be excluded from the sanitary sewers.

6. That the institution be provided with adequate fire apparatus and a fire alarm system.

7. That more buildings be provided if the present or a greater number of students is to attend the institution.

8. That proper heating, plumbing, sewerage and sewage disposal facilities be provided at the Mott farm and at the other farm buildings.

CHARITABLE AND REFORMATORY INSTITUTIONS

(Albion) Western House of Refuge for Women

The Western House of Refuge for Women is located near the western boundary of the village of Albion, Orleans county, N. Y. The station of the N. Y. C. R. R. in the village is about one mile from the institution and the station of the B. L. & R. Electric R. R. is located practically at the gate of the institution. The Erie canal passes the institution just north of and the N. Y. C. R. R. just south of the grounds. A small creek runs through the property. In the vicinity of the buildings the slopes are such that the drainage is good but some portions of the farm lands are rather low and the drainage not so satisfactory. There are 22 occupied buildings. The most important are the administration building, 7 cottages, the hospital, the amusement hall and the power house. In addition to these there are the necessary farm buildings. The area of the property owned for the use of the institution is 92.5 acres.

The institution receives upon commitment any female between the ages of sixteen and thirty years, convicted by any court or magistrate of petit larceny, vagrancy, habitual drunkenness, of being a common prostitute, or frequenting disorderly houses or houses of prostitution, or of a misdemeanor, and who is not insane, nor mentally or physically incapable of being substantially benefited by the discipline of such institution. The capacity of the institution is 217 inmates. At the time of the inspection the total population was 246, made up of 193 inmates and 53 employees.

An examination of the sanitary condition of the institution was made on February 17, 1917. As a result of this examination several insanitary conditions were found to exist and the report on the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That in view of certain insanitary conditions in some of the buildings at the institution as described in detail in the body of this report:
   (a) The necessary repairs or alterations be made in the reception cottage to place the building in a good sanitary condition.
   (b) The floors be replaced where necessary.
   (c) Painting and repairing be done where these are needed.

2. That in view of the unsatisfactory condition of the auxiliary water supplies of the institution, the use of the well near the farm house and the well near the power house be discontinued.

3. That obsolete plumbing be replaced by plumbing of the modern type as soon as possible.

4. That proper toilet facilities be provided at the barn and that the privy near the barn be abandoned.

5. That the receptacle for the storage of the garbage at the piggery be provided with a cover and be kept covered.

6. That adequate facilities be provided for heating the industrial building at all times.

7. That the milk obtained from outside dealers be made to conform to a standard of good sanitary quality or that the milk be pasteurized at the institution.

(Batavia) New York State School for the Blind

The New York State School for the Blind is located in Genesee county, in the northern part of the village of Batavia. The buildings are situated on a knoll at an elevation of about 920 feet above mean sea level and higher than all other land in the vicinity. There are in all 11 buildings belonging to the institution, the more important of them being the main building, the kindergarten building, power house and laundry, gymnasium, hospital, green house and barn. The area of the grounds owned for use in connection with the institution is 60 acres.

The institution receives blind persons residing in the State of New York, outside of the counties of New York, Kings, Queens, Nassau, Suffolk, Richmond, Westchester, Putnam and Rockland, who are not under five or over twenty-one years, and who are not incapacitated by mental, physical or moral infirmity for useful instruction. The capacity of the institution is 180 pupils. At the time of the inspection the enrollment was 174 pupils in addition to which there were about 73 attendants, making a total of 247.

This institution was inspected on February 16, 1917, and the report covering in detail the results of the examination contained the following conclusions and recommendations.

Conclusions and recommendations

1. That in view of the unsatisfactory character and quality of the three water supplies used at the institution, these supplies all be eliminated and a new supply sufficient for the needs of the institution in all respects and of a safe quality be provided in their stead. This may be accomplished either by installing an entirely new supply or by using the city water for all purposes when this water, after proper treatment, shall be found to be of a safe sanitary quality. I would further recommend that until this is done every precaution be used to make the city water and the cistern water inaccessible to the pupils and scholars at the school.

2. That stand pipes and hose be provided in the industrial building and that a portable hose cart and hose for outside use also be provided.

3. That as recommended in the previous report better and more convenient storage accommodations be provided for storing supplies of food other than those kept in the cold storage.

4. That additional toilet facilities more conveniently located be provided where necessary.

5. That all connections for the discharge of storm or roof water into the sanitary sewers be disconnected and such water be discharged into the storm sewers.

(Bedford Hills) New York State Reformatory for Women

The New York State Reformatory for Women is located in the town of Bedford, Westchester county, N. Y., about 1 mile east of Bedford Hills and is reached from New York city over the Harlem division of the New York Central R. R. to Bedford Hills thence by conveyance to the institution. A small stream known as Broad Brook, which is tributary to the Croton water supply, flows through the grounds belonging to the institution. The buildings

are all located on elevated ground but the drainage is not entirely satisfactory. Work is now in progress for improving the drainage conditions. There are 31 occupied buildings, the most important of which are the administration building, 12 cottages, the reception building, the two hospitals and the power house. In addition to these there are the usual farm buildings. The area of the grounds owned for the use of the institution is 195.5 acres. The capacity of the institution is 496 inmates exclusive of hospital, infants and disciplinary. At the time of the inspection the total population was 511 made up of 405 inmates and 106 employees.

An examination of the sanitary condition of the institution was made on July 2–3, 1917. As a result of the investigation certain insanitary conditions were found to exist and the report covering in detail the results of the examination contained the following conclusions and recommendations.

Conclusions and recommendations

1. That in view of the unsatisfactory condition of a number of the buildings, as pointed out in detail in the body of the report:

(a) The plaster of the walls and ceilings and floor of all cottages be repaired where such repairs are needed and also all pantries be properly equipped with satisfactory shelving and cupboards and more effective steps be taken to eliminate roaches, water bugs, etc.

(b) Rebecca Hall be thoroughly overhauled, repaired and remodeled so as to render it sanitary in all respects, and as modern as practicable, or a new building be constructed of satisfactory design and construction for the purposes for which this building is used.

(c) Proper drainage be installed to carry away the water which accumulates in the cellar entrances.

(d) Proper screens be provided for the institution.

2. That in view of the unsatisfactory sanitary quality of the water supply, and inadequacy of the system for fire protection purposes:

(a) Suitable chlorinating apparatus be installed and put in operation at the earliest possible date.

(b) The pipe connection from the pumps to the old well be entirely removed.

(c) Reducing valves and other appurtenances be installed at all points where necessary.

(d) The pumps be thoroughly overhauled and if necessary new pumps be installed.

3. That in regard to fire protection:

(a) Adequate fire fighting apparatus for outside use be provided at the institution and that this apparatus be stored in a fireproof building easy of access and centrally located if possible.

(b) The necessary fire fighting apparatus be provided in the interior of the buildings where this is not now provided and that effective measures be taken for the maintenance of this apparatus in a condition so that it will be instantly available for fire fighting.

4. That in view of the obsolete plumbing and its unsatisfactory condition in some of the older buildings as pointed out in detail above, this plumbing be thoroughly overhauled and remodeled to conform with modern practice.

5. That in view of the apparently inadequate heating facilities for Rebecca Hall and Cowdin cottage adequate heating facilities be provided for those buildings.

6. That in regard to the milk supply:

(a) If it is necessary to obtain milk from outside parties the institutional authorities regularly inspect the dairies from which the milk comes and take proper precautions to make sure that the milk is at all times of a satisfactory quality.

(b) The cow barn be remodeled so as to provide satisfactory facilities for producing milk of good quality or a new cow barn of proper design and construction be built.

(c) More effective measures be taken to see that the milk containers are properly sterilized.

7. That the gas vents of the Imhoff tanks be kept free from scum at all times.

(Hudson) New York State Training School for Girls

The New York State Training School for Girls is located in the southern portion of the city of Hudson in Columbia county near an arm of the Hudson river known as South Bay. The institution owns 171 acres of land. The buildings consisting of an administration building, chapel, industrial building, teachers' quarters, storehouse, disciplinary, power house, 14 cottages, barn and other accessory buildings, 28 in all, are located on a plateau at an elevation of about 100 feet above the level of the river.

The institution is maintained for the reception of girls not over the age of 16 years who shall be legally committed thereto or placed in charge of such institution by any court having authority to make such commitments or to place such girls therein. At the time of the inspection the population of the institution was 325 inmates and approximately 100 attendants, making a total of 425. The capacity of the institution is 366 inmates and 77 attendants, a total of 443.

An inspection of this institution was made on January 13, 1917, and the report made on this investigation contained the following conclusions and recommendations.

Conclusions and recommendations

1. That the sewage disposal plant be repaired and placed in efficient working order and be maintained in such a condition and that the steps necessary to the proper adjustment of the matter of the discharge of effluent from the disposal plant be taken as rapidly as possible in order that the insanitary conditions now caused by the improper discharge of sewage from the institution may be abated.

2. That a modern structure providing sufficient and satisfactory quarters for the teachers and staff be provided and that the old hospital building now being used for that purpose be either abandoned or used for some purpose for which it is better adapted.

3. That a proper fire alarm system be provided in the way of electric annunciators to eliminate the necessity of locking the girls in their rooms at night.

4. That barns be constructed at a point more remote from the hospital and other main buildings or that the barns at the McIntyre property be put in shape to be used.

5. That a new building of a modern type be provided for industrial purposes or that the old one now being used be repaired and remodeled so as make it safe and sanitary in all respects.

6. That a disciplinary building be provided with proper ventilation and sanitary plumbing fixtures and the building now used for this purpose be either abandoned or be used for some other more appropriate purpose.

(Newark) New York State Custodial Asylum for Feeble-Minded Women

The New York State Custodial Asylum for Feeble Minded Women is located on the top of a hill just east of the village of Newark, Wayne county, N. Y., on the south side of a valley which at this place extends east and west and is about one mile wide. Passing through the valley are the tracks of three railroad systems, an electric railroad, and the Barge Canal. Ganargua or

Mud creek flows in a winding course through the valley, finally emptying into Canandaigua outlet at Lyons. The site of the institution appears to be admirably selected, offering good drainage and excellent transportation facilities. The area of the grounds used in connection with the institution is 106 acres. There are 13 occupied buildings, consisting of the main building with two wings, 6 cottages, the hospital, the employees building, the power house and the green house. In addition to these there are the usual farm buildings and sheds.

The institution receives feeble-minded women of child-bearing age who are residents of the State. It aims to improve their mental, moral and physical condition. The capacity of the institution is 850. At the time of the inspection the population consisted of 853 inmates and 48 employees, making a total of 901.

An examination of the sanitary condition of the institution was made on June 7, 1917. As a result of this investigation certain insanitary conditions were found to exist and the report covering in detail the results of the inspection contained the following conclusions and recommendations.

Conclusions and recommendations

1. That in view of the unsatisfactory conditions of the building in some respects:
   (a) A modern cold storage plant of adequate capacity be provided.
   (b) In all places where floors, walls or ceilings are in need of repairs, such repairs be made without delay, and that the buildings be maintained in a satisfactory condition at all times.
   (c) Suitable window and door screens be provided for all dining rooms and kitchens.
   (d) A modern laundry with adequate equipment be provided.
2. That in view of the unsatisfactory condition of the present water supplies and the apparent need of a new supply adequate in quantity and satisfactory in quality:
   (a) The institution authorities complete the plant for the filtration and chlorination of the water derived from the Barge Canal as soon as possible.
   (b) Steps be taken at once to eliminate the sources of pollution existing around the spring.
   (c) All cross connection between the spring and Barge Canal water supplies be eliminated as previously recommended by this Department.
3. That in regard to plumbing:
   (a) The plumbing in cottage D be renewed and be remodeled to conform with modern practice.
4. That an adequate fire alarm system be installed at the institution.
5. That the horse manure be removed at sufficiently frequent intervals to prevent fly breeding and be disposed of in a sanitary manner.

(Randall's Island, New York City) New York House of Refuge

The New York House of Refuge is located on Randall's Island, New York city, and is reached by the ferry from the foot of E. 125th street. The area of the grounds used in connection with the institution is 37.5 acres. There are 12 occupied buildings arranged in two groups, one used for the older and the other for the younger boys detained at the institution.

The institution is a reformatory for boys under 18 years of age, charged with and convicted of crime, juvenile delinquency, vagrancy or disorderly conduct, who are given a common school education and industrial instruction. The capacity of the institution is 1,000 inmates. At the time of the inspection the total population was 800, made up of 675 inmates and 125 employees.

An examination of the sanitary condition of this institution was made on December 28, 1916. As a result of this investigation certain insanitary conditions were found to exist and the report on the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That the drinking fountains in the yards be either remodeled so that the flow of water may be better controlled or that they be replaced by fountains which are better designed and constructed.
2. That every effort be made to maintain the trough closets in the yard in a sanitary condition at all times or that they be replaced by flush closets as recommended in the previous report.
3. That adequate plumbing fixtures including urinals be provided throughout the institution where the number is not sufficient.
4. That the garbage receptacles be kept covered at all times of the year.
5. That since unsatisfactory conditions exist in some of the buildings with respect to the floors, walls and ceilings especially in the officers' quarters in the north wing of the main division, the necessary repairs be made to remove these conditions and that the buildings be maintained in a good state of repair at all times.

(Oxford) New York State Women's Relief Corps Home

The New York State Women's Relief Corps Home is located on the Chenango river, about one mile northeast of the village of Oxford, Chenango county, N. Y. The D. L. & W. traverses the northwesterly boundaries of the grounds, and the Ontario and Western R. R. passes through the opposite sides of the grounds. The buildings consist of a main group composed of cottages, and the hospitals which are connected by corridors and extend over a distance of nearly 1,000 feet, and various other accessory buildings, including barns, store houses, etc., all situated on an elevated plateau overlooking the Chenango valley. The institution owns 103½ acres of land, most of which is used for agricultural purposes.

The object of the institution is to provide a home for aged dependent veterans and their wives, veterans' mothers, widows and army nurses who are residents of the State of New York. The average population of the institution is approximately 197 inmates and 58 employees, making a total of 255.

The sanitary condition of the institution was examined on September 4, 1917. As a result of this investigation it was found that certain insanitary conditions existed at the institution and the report on the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That since there is a possibility that the water supply may be polluted by the stock in the vicinity of the springs:
   (a) The auxiliary supply from D. L. & W. railroad tank be abandoned and water from the drilled well be used to supplement the spring supply.
   (b) The springs be protected by fences enclosing them and the land draining toward them.
2. That in view of the unsatisfactory method of disposal of the sewage:
   (a) The new sewage treatment plant be put in operation as soon as possible.

(b) That the chlorinating apparatus which has been temporarily omitted on account of lack of funds be installed as soon as the necessary appropriation can be secured.

3. That the insanitary condition of the garbage platform and shed near the kitchen be corrected by the construction of a new and more appropriate platform and shed.

4. That more adequate toilet facilities be provided on the third story of Cottage C by the installation of another bath-room.

5. That in view of the difficulty of keeping the wooden floors of the toilet rooms in sanitary condition, tile floors be installed in the men's toilet in Cottage B, and in the bath-room on the third floor of Cottage C.

6. That since the use to which the fire hydrant at the barn is now being put is liable to render it unavailable in case of fire, the attachments now on that hydrant be removed and the hydrant used for fire protection purposes only.

7. That in view of the inadequacy of the means of egress from the third floor of Cottage C fire escapes be installed on this building.

8. That in view of the insanitary conditions of the piggery, the buildings be repaired or reconstructed and the yards properly drained.

9. That since the hall on the third floor of Cottage C is not satisfactorily ventilated or lighted, alterations be made to obtain satisfactory lighting and ventilation.

10. That in view of the fact that the means of egress in case of fire from the second floors of the cottages are not sufficient for the safety of the inmates, each cottage be provided with fire escapes or means of egress other than the single wooden stairway.

(Ray Brook) New York State Hospital for Incipient Pulmonary Tuberculosis

The New York State Hospital for Incipient Pulmonary Tuberculosis is located in the Adirondack mountains, on Ray Brook, Essex county, N. Y. There are 7 occupied buildings. In addition to these buildings about 30 tents are pitched during the summer and occupied by patients. With the exception of the power plant all the buildings are situated on elevated grounds about 40 or 50 feet above the level of the railroad and 50 or 60 feet above Ray brook, a small stream which flows through the grounds just south of the railroad. The total area of the grounds owned in connection with the institution is 512 acres.

The institution receives patients having incipient pulmonary tuberculosis who are without funds. The capacity of the institution is 320 patients. At the time of the inspection the population of the institution was 288 patients and 107 employees, making a total of 395. During the summer the population is increased by the number of patients occupying the tents to about 360, making a total population of about 460.

An examination of the sanitary condition of the institution was made on April 30, 1917, and the report setting forth in detail the results of the investigation contained the following conclusions and recommendations:

Conclusions and recommendations

1. That the recommendations of the report dated June 21, 1916, on the special investigation of the sewage disposal plant be carried out.

2. That the necessary repairs be made to the disposal plant to place it in good operating condition and that it be operated efficiently at all times.

3. That the halls be lighted at night by some system which will not constitute a menace from fire, that adequate fire fighting apparatus and a sufficient number of hydrants be provided, and a proper fire organization be established among the employees.

4. That the water pressure at the institution be increased sufficiently to be adequate for fire protection.

5. That means for properly pasteurizing the milk supply be provided as soon as possible.

(Rome) Rome State Custodial Asylum

The Rome State Custodial Asylum is located about 2 miles southwest of the city of Rome, Oneida county, N. Y. The area of the grounds owned for the use of the institution is about 600 acres. There are 13 occupied buildings. The main buildings form a connected group extending east and west about 1,400 feet with two wings extending north and south about 200 feet. In addition to these there is the power house, and the usual farm buildings. Two farm colonies located at some distance from main buildings are conducted in connection with the institution.

The inmates of the institution consist of indigent, feeble-minded persons of both sexes, except able bodied children between the age of 7 to 14 who are able to use language and except feeble-minded women of the child bearing age, the latter two classes being cared for at other institutions of the State. At the time of the inspection the total population of the institution was 1,797, made up of 1,567 inmates and 230 employees.

The sanitary condition of the institution was examined on January 17 and 18, 1917. As a result of this investigation certain insanitary conditions were found to exist, and the report on the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That an adequate water supply be furnished at the institution by the construction or use of additional or larger mains from the city of Rome to the institution.

2. That because of the possibility of the water supply obtained from the infiltration gallery of Brush farm, which is at times undoubtedly polluted, being used for drinking water, this supply be abandoned.

3. That, as there is danger of the serious pollution of the well used at the Stook farm, this well be abandoned as soon as possible, and that the water be boiled before being used for drinking purposes until the well is abandoned.

4. That in view of the overcrowded condition of the institution, more room be provided either by new buildings or additions to the present ones, if the present number or a greater number of patients is to be cared for.

5. That in view of the inadequacy of the plumbing facilities in some respects, more adequate facilities be provided where needed.

6. That adequate living quarters be provided for the employees.

7. That the old wooden stairs in building D be replaced by new ones which are fire-proof.

8. That the floors in the building of the farm colonies which are in need of repairs be repaired.

9. That in regard to the sewage disposal plant, recommendations made in the previous report on the special investigation be carried out.

(Syracuse) Syracuse State Institution for Feeble-Minded Children

The Syracuse State Institution for Feeble Minded Children is located in the western part of the city of Syracuse, Onondaga county, N. Y. A farm conducted in connection with the institution is located about ¼ mile north of Fairmont station on the Auburn branch of the N. Y. C. & H. R. R. R., and about 4½ miles northwest of the institution proper. The area of the grounds around the main buildings is 65 acres, and the area of the farm at Fairmont 210 acres. The main group of buildings consists of the administration building, laundry and power house, garden cottage, barn and other minor structures. They are all situated on high ground at an elevation of about 480 feet above mean sea level.

The object of this institution is to furnish the means of education to that portion of the youth of the State not provided for in any of its other educational institutions, and only children between the ages of 7 and 14 who are feeble-minded, or so deficient in intelligence as to be incapable of being educated at any ordinary school and who are not epileptic, paralyzed, helpless, insane or greatly deformed. At the time of the inspection the enrollment was 598 inmates. In addition to this there were 125 attendants, making a total of 723. The capacity of the institution is 600 inmates.

The sanitary condition of the institution was examined on January 17–20, 1917. As the result of this investigation certain insanitary conditions were found to exist and the report on the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That the work of repairing the ceilings and plaster in the buildings be completed as soon as possible.

2. That the reservoir of the main building at Fairmont farm be properly protected against pollution.

3. That the toilets on the grounds at the main institution be either properly prepared for winter use or be more securely protected against forcible entrance.

4. That, as soon as possible, the privies at Fairmont farm be abolished and a proper system of sewage collection and disposal for the entire farm buildings be built. In this connection I would also recommend that, until proper sewerage and sewage disposal works are built at the farm, the privies be properly constructed with removable containers, seat covers and doors and be made inaccessible to flies.

5. That dormitories for which toilets and baths are not provided be provided with such facilities.

6. That adequate fire protection be provided at Fairmont farm.

7. That all plumbing fixtures not properly provided with vents be properly vented.

8. That the necessary repairs be made and drains installed to prevent seepage of water into the basements of the buildings.

9. That the work of extending, repairing and remodelling the steam heating system of the institution be completed as soon as possible.

10. That the use of school rooms in which the lighting is inadequate be discontinued and others having sufficient light be provided, or that necessary improvements be made to furnish satisfactory light for those being used.

11. That careful studies of the comparative cost of placing the existing buildings in a satisfactory condition and of erecting structures of better design be made in order to determine the most economical course to be pursued, and that action along the most economical course be taken at once.

(Thiells) Letchworth Village

Letchworth village is located near Thiells station, on the Erie railroad, in Rockland county, N. Y., and is about 3 miles from Haverstraw, on the West Shore railroad. A large portion of the land is located in the mountains bordering the Minisceongo creek, while the institution proper is located in the creek valley. The present buildings for inmates consist of two groups of colonies known as the Secor and Dosbrow colonies. The number of occupied buildings is 10, and in addition to these there are the usual farm buildings and sheds. The area of the property owned for use in connection with the institution is 2,100 acres.

The object of the institution is to care for epileptic and feeble-minded persons. At the time of the inspection the total population was 401, made up as follows: Inmates, 255 boys; 75 girls; attendants and employees, 60. The capacity of the institution was at the time of the inspection 340.

An examination of the sanitary condition of the institution was made on March 27–28, 1917. As a result of this investigation certain insanitary conditions were found to exist, and the report on the inspection included the following conclusions and recommendations:

Conclusions and recommendations

1. In regard to water supply.
   (a) That in view of the possibility of camps being constructed on the watershed of the main supply, or of other sources of pollution being established the institution authorities continue to make inspections of the watersheds at sufficiently frequent intervals to protect them from this form of pollution.
   (b) That the use of wells be discontinued wherever possible, but where it is necessary to use a well it be adequately protected against pollution.
   (c) That consideration be given to treating the water for the removal of carbon dioxide.
2. That the sewage disposal plant be placed in efficient operating condition and be given the regular and careful attention necessary to assure its satisfactory operation at all times.
3. That in order to adequately protect the milk supply:
   (a) The construction and proper equipment of the milk house be completed as soon as possible.
   (b) The wooden plugs now used as covers for the milk cans be abolished and more suitable covers be provided.
4. That a more adequate fire fighting organization properly supplied with the necessary apparatus be provided at the institution.

(West Haverstraw) State Hospital for Crippled and Deformed Children

The State Hospital for Crippled and Deformed Children is located at West Haverstraw, Rockland county, N. Y. The institution is about 1 mile from the Hudson river and 1½ miles northwest of the West Haverstraw station of the West Shore railroad. There are eight buildings consisting of the administration building, solarium, isolation building and other buildings of less importance. The buildings are all located on elevated ground where the drainage in general is satisfactory.

The object of the institution is to furnish proper care and treatment for dependent children who are residents of New York State and who are crippled and deformed or are suffering from disease from which they are likely to be-

come crippled or deformed. At the time of the inspection there were 113 patients at the hospital. The certified capacity of the hospital is 70.

As the result of the inspection made of the institution on March 27, 1917, a report stating in detail the conditions, contained the following conclusions and recommendations:

Conclusions and recommendations

1. That new buildings or additions to the present ones be constructed to eliminate the overcrowding of the wards, officers' and employees' quarters, storage, kitchen and laundry and the buildings be repaired and painted where necessary.

2. That the institution be maintained in a clean condition at all times and no soiled bed or other linen be used.

3. That as recommended in the 1910 and subsequent reports unless the present water supply is made uniformly safe in quality either by protection of its sources from contamination or by proper treatment, the institution authorities proceed at once to develop a new supply according to the plans approved by this Department.

4. That a sewage disposal plant for at least partial treatment of the sewage, plans for which should be submitted to this Department for approval, be constructed.

5. That owing to the uncertain quality of some of the milk furnished the institution and the difficulty of controlling the conditions under which it is produced.

(a) The milk now being used which is not previously pasteurized be pasteurized at the institution and that the institutional authorities request the Agricultural Department to regularly inspect all of the dairies and herds furnishing milk to the institution.

(b) That if possible additional pasture land be purchased and the institution provide its own herd of cows which should be tested by the Department of Agriculture to insure that it is free from tuberculosis and further that such herd be frequently tested thereafter to insure the maintaining of a tubercular free herd.

6. That all of the buildings of the institution be provided with an adequate and properly constructed heating system and that the use of coal stoves and other heating appliances of a similar nature be discontinued.

7. That more adequate fire protection for the institution be provided.

STATE HOSPITALS FOR THE INSANE

(Brooklyn) Brooklyn State Hospital

The Brooklyn State Hospital is located in the Flatbush District, Borough of Brooklyn, city of New York. A farm conducted in connection with the hospital is located at Creedmore on Long Island, about 12 miles from the institution proper. The area of the grounds around the main buildings is 35 acres and the area of the farm at Creedmore is 193 acres. The buildings consist of the main group which is really composed of seven separate buildings connected by corridors; the industrial building, kitchen, laundry, amusement hall and other necessary accessory buildings. In addition to these two buildings were under construction at the time of the inspection. There are sixteen or seventeen buildings on the farm, only two of which were occupied at the time of the inspection.

The hospital admits as patients insane persons, except criminal insane, from the county of Kings which comprises the Brooklyn State Hospital district. The certified capacity of the hospital is: men, 342; women, 295; total, 637. At the time of the inspection the total population of the institution was 889 inmates and 123 attendants, making a total of 1012.

An examination of the sanitary condition of the institution was made on March 9 and 10, 1917. The report giving in detail the results of this inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That in view of the dilapidated condition of the old buildings they be thoroughly overhauled and repaired and rendered sanitary or, preferably, that additional new buildings modern in type and of sufficient capacity to accomodate all the inmates of the institution be constructed and the old buildings removed.

2. That in view of the insanitary condition of the plumbing in the old buildings it should be thoroughly overhauled in connection with the repairs of the buildings or that, if the old buildings are to be abandoned and new ones constructed, the necessary repairs be made to keep the plumbing in a sanitary condition until the new buildings are ready for occupancy.

3. That the necessary repairs be made or equipment provided for adequately heating all parts of the institution.

4. That the general overcrowding of the institution be eliminated as soon as the buildings now under construction are ready for occupancy, and that in the meantime the present overcrowding be obviated as far as possible by careful sanitary regulations.

(Buffalo) Buffalo State Hospital

The Buffalo State Hospital is situated in the northern portion of the city of Buffalo, Niagara county, N. Y., about 1 mile from the Niagara river. The area of the grounds is about 1,704 acres. There are twenty-four occupied buildings. The main group consists of the administration building, on either side of which is a wing consisting of five separate buildings connected by corridors. The Elmwood group is similarly arranged but there are only two buildings on each side of the main building. In addition to these there are four other buildings used as wards, six for industrial purposes, eight for employees quarters, one for a poor house and a number of accessory buildings and sheds.

The hospital receives as patients insane persons, except criminal insane, from the counties of Erie and Niagara. The certified capacity of the institution is 1,704. At the time of the inspection the total number of inmates was 2,178.

The sanitary condition of the institution was examined on February 15, 1917. As a result of this investigation certain insanitary conditions were found to exist and the report on the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That in view of the insanitary condition of the building, causing insanitary conditions in certain respects:
   (a) The floors, walls and ceilings be repaired where necessary.
   (b) That painting be done in the wards and water sections where necessary.
2. That in regard to plumbing:
   (a) The obsolete plumbing fixtures in use at the institution such as the long hopper wash down closets, be removed and modern sanitary fixtures be provided instead.
   (b) That more fixtures be provided in the various wards of the institution in accordance with the requirements indicated above in this report.
3. That since the heating and ventilating facilities are apparently unsatisfactory in some cases these be remodeled or be replaced where necessary, and that better facilities for storing and handling the coal be provided at the institution.
4. That, if the present or a greater number of patients is to be cared for at the institution, more room be provided by erecting new buildings or additions to the present ones to relieve the overcrowded condition.
5. That the water softener be put in efficient service as soon as possible.

(Central Islip) Central Islip State Hospital

The Central Islip State Hospital is located at Central Islip, Suffolk county, N. Y., about 40 miles from New York city. The area of the grounds is about 1,000 acres. There are forty-one occupied buildings arranged in two groups, known as the North and South Colonies.

The hospital admits as patients insane persons, except criminal insane, from the boroughs of Manhattan, Queens and Bronx and from the counties of Nassau and Suffolk. At the time of the inspection the total population of the institution was 5,916, made up as follows: patients 5,081; staff, 38; other employees, 797. The certified capacity of the institution is 4,017 persons.

An examination of the sanitary condition of the institution was made on December 29 and 30, 1916. As a result of this examination certain insanitary conditions were found to exist and the report on the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That the quarantine quarters be put in a sanitary condition and be properly equipped with heating, plumbing and other facilities, or that new quarters properly constructed and equipped be provided.
2. That, in view of the possibility of the pollution of the present general well water supplies becoming actively dangerous, the deep well water supplies be developed as rapidly as possible.
3. That the pump be removed from the shallow well near the main entrance.
4. That the use of drinking cups in common by patients, attendants and vistors be discontinued and drinking fountains be installed in their place.
5. That the use of towels in common by patients, attendants and visitors be discontinued and individual towels be used in their place.
6. That, in view of the insufficient number of plumbing fixtures in some parts of the institution as pointed out in the body of the report, better

plumbing facilities be provided where needed. In this connection I would also recommend that adequate toilet facilities for visitors be provided.

7. That, in view of the overcrowded condition of many of the wards, more room be provided either by constructing additions to the present buildings or by erecting new ones.

8. That steps be taken to improve the method of sewage disposal either by carrying out the recommendations made by this Department in the reports of 1910 and 1914 or by the design and construction of other disposal works, plans for which should be approved by this Department as required by Section 14 of the Public Health Law. In this connection I would also recommend that, in order to promote efficient operation of the disposal works, the sludge which is removed from the settling tank be disposed of on a properly constructed sludge bed; the sewage irrigation area be ridged in winter and an electrically driven pump be installed at the South Colony sewage disposal pumping plant.

9. That the insanitary privies located about the grounds be abolished. Where it is unavoidable that privies be used, I would recommend that they be constructed with tight removable receptacles for the excreta, be provided with seat covers and doors and be screened from flies and be maintained in a sanitary condition.

10. That the floor in the main kitchen and scullery of the North Colony be repaired.

11. That the paint be renewed and new plastering be done where this is necessary.

12. That the insanitary conditions at the bone mill be improved as rapidly as possible.

13. That the garbage both at the storage bin near the piggery and where dumped in the trench near the bone mill be kept covered.

(Gowanda) Gowanda State Homeopathic Hospital

The Gowanda State Homeopathic Hospital is located in the town of Collins, Erie county, N. Y., on the Salamanca Division of the Erie railroad, about 2 miles north of the village of Gowanda. The area of the grounds owned for use in connection with the institution is 500 acres. The buildings consist of the main group comprising the administration building and the wards, the farm group consisting of the farm house, barns and necessary accessory buildings, and numerous isolated buildings located near the main group including the superintendent's residence, nurses' house, amusement hall, etc.

The hospital receives as patients insane persons, except criminal insane, from the counties of Cattaraugus, Chautauqua, Erie and Wyoming and patients from any part of the State for whom homeopathic treatment is desired. At the time of the inspection the total population of the hospital was 1,455, made up of 1,236 patients and 209 attendants. The certified capacity of the hospital is 998 patients.

An examination of the sanitary condition of the hospital was made on February 14 and 15, 1917. As a result of this investigation certain insanitary conditions were found to exist and the report covering in detail the results of the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That with respect to the water supply:

(a) In view of the limited yield and questionable quality of the present supply the development of an adequate supply of water of unquestioned sanitary quality be completed as soon as possible.

(b) That the water from the Reservation springs which are open to surface wash and the run-off from ravines be wasted and that until this is done the water be piped from the points at which it

issues from the ground to the air lift chamber and the springs and air lift chambers be made and be maintained inaccessible for dipping out water.

(c) That the Reservation springs and air lift be enclosed by a fence.

(d) That the gravel pit be surrounded by a fence.

(e) That the concrete reservoir near the laundry and power house be covered.

(f) That the force main from the springs be so extended as to discharge near the corner of the reservoir diagonally opposite the suction main.

(g) That the water used to operate the elevators at the institution be wasted.

2. With reference to sewerage:

(a) That plans for the separation and treatment of the sewage be prepared and submitted to this Department for approval as required by Section 14 of the Public Health Law.

(b) That the privies be abolished whenever possible. Where it is necessary to use privies I would recommend that they be so located as not to pollute a water supply, be properly constructed so as to be inaccessible to flies and be maintained in a sanitary condition.

3. That additional plumbing fixtures be installed where needed, in accordance with the standard indicated in the body of this report.

4. That in view of the overcrowded conditions at the institution new buildings or additions to the existing buildings be provided in order that no dormitory may have less than 600 cubic feet of air space per bed and not less than 50 square feet of floor space per bed in addition to at least 40 square feet of day room space per patient.

5. That the hospitals and dining rooms be effectively screened against flies.

6. That the manure pits be screened or covered.

7. That the milk cans be sterilized daily.

(Kings Park) Kings Park State Hospital

The Kings Park State Hospital is located at Kings Park, Long Island, on the Wading river Branch of the L. I. R. R., about 45 miles from the Pennsylvania Railroad station in New York city. The main buildings of the hospital are about 1 mile from the north shore of Long Island. The area of the grounds owned for use in connection with the hospital is about 834 acres. There are 62 occupied buildings, 35 of which are used as wards for patients and the others for employees quarters, dining rooms, workshops and other purposes. The hospital receives as patients insane persons, except criminal insane, from the Borough of Queens and the counties of Nassau and Suffolk. At the time of the inspection the total population of the hospital was 5,166, made up of 4,342 patients and 774 employees. The certified capacity of the hospital is 3,397 patients.

An examination of the sanitary condition of the hospital was made on March 20, 21, and 22, 1917. As a result of this investigation certain insanitary conditions were found to exist and the report covering in detail the results of the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That, in view of the unsatisfactory condition of some of the buildings, especially the older buildings, as pointed out in this report, the necessary repairs be made to put them in a satisfactory condition or new buildings of a modern type be built.

2. That, in respect to the water supply, added storage of sufficient capacity to furnish water at a sufficient pressure for fire purposes be provided at once.

3. That, in regard to sewerage and sewage disposal:

(a) The discharge of sewage from the superintendent's residence and from the residence of the ground's supervisor, directly into Long Island Sound, be discontinued and the sewage from these buildings be discharged through the sewage disposal plant, or be disposed of in properly constructed subsurface irrigation systems.

(b) The sink water from the cottages be discharged into the sanitary sewers.

(c) Proper disposal be made of the drainage from the piggery and from the barn.

(d) The size of the sewage disposal plant be increased as soon as possible to such an extent that it will be adequate to care for the present and immediate future needs of the hospital.

(e) The sludge removed from the sludge drying bed be placed in a suitable dump and that such dump be located above high water mark on account of the danger of polluting the river. If it is desired to use the sludge for agricultural purposes, it should be placed on land where no crops for human consumption would be grown for two or three years.

(f) The final settling tank be cleaned out and placed in use and operated efficiently and if necessary, another sludge bed be constructed below the final settling tank for the drying of sludge from this tank.

(g) The final effluent from the disposal plant be sterilized with liquid chlorine, or other suitable disinfectant, in order to prevent contamination of the waters of Smithtown Bay and its tributaries.

(h) The gas vents of the Imhoff tanks be kept clear of scum.

(i) The use of privies be discontinued wherever possible, and where it is necessary to use a privy, it be located where no water supply will be polluted, be properly screened against flies, and be maintained in a sanitary condition.

4. That, in view of the inadequacy or unsatisfactory condition of some of the plumbing fixtures:

(a) More fixtures, such as water closets, lavatory bowls and baths, be provided in all places where needed in accordance with the standard given in this report.

(b) All fixtures in an unsatisfactory condition or not operating satisfactorily be repaired or be replaced by others of a suitable type.

5. That, in view of the overcrowded condition of the hospital, more room be provided either by additions to the present buildings or by erecting new ones. This can be accomplished to some extent by removing the partitions between some of the single rooms in certain of the wards and converting them into larger dormitories, thus making the excess space in the single rooms available.

6. That, in regard to the milk supply, a steam sterilizer be provided at the dairy for sterilizing the milk cans, pails, and other utensils as soon as possible.

(New York City) Manhattan State Hospital

The Manhattan State Hospital is situated on Ward's Island, in the city of New York, and may be reached by ferry from the foot of East 110th street. There are 47 occupied buildings, 20 of which are used as wards for patients and 10 as quarters for officers and attendants. The remainder include the assembly hall, 2 churches, 3 work shops, 3 power houses, and various accessory buildings. The area of the grounds is 245 acres.

The hospital receives as patients insane persons, except criminal insane, from the boroughs of Manhattan, Richmond and Bronx, in the city of New York. The certified capacity of the hospital is 3,699 patients. At the time of the inspection there were 5,236 patients and 530 attendants at the hospital, making a total of 5,766.

An examination of the sanitary condition of the hospital was made on March 22, 23 and 24, 1917. As a result of this investigation certain insanitary conditions were found to exist and the report covering in detail the results of the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. Owing to the unsatisfactory arrangement and condition of some of the buildings I would recommend:

(a) That all buildings be repainted and repaired where they are not in good condition.

(b) That proper drains be provided and other necessary provisions be made to eliminate the dampness from the buildings known as Old Branch and New Branch.

(c) That better provisions be made to admit light and air to these buildings, or that other day rooms be provided.

2. That in view of the inadequacy of the plumbing fixtures in most of the wards of the institution and to their unsatisfactory type in most cases

(a) Additional fixtures be provided in all cases where needed in accordance with the standard given in the body of this report.

(b) The old and obsolete fixtures be replaced by modern sanitary ones.

3. That with reference to sewerage

(a) Screens be provided to prevent rags and similar material that is thrown down the flush closets by the patients from reaching the sewers.

(b) The sewer outlets be extended so that they discharge under water at all times.

(c) The insanitary toilet near the bake shop be discontinued and modern sanitary plumbing fixtures be provided for this building.

(d) The use of privies be abandoned wherever possible and modern flush closets be installed in their places. Where it is necessary to use a privy, I would recommend that it be located where a water supply will not be endangered, be made inaccessible to flies and be maintained in a sanitary condition.

4. That in view of the very overcrowded condition of the institution, giving insufficient air and floor space in nearly all the wards, additional wards or buildings be provided or the present excess of inmates over the certified capacity be transferred to some other institution.

5. That more satisfactory quarters be provided for employees.

(Ogdensburg) St. Lawrence State Hospital

The St. Lawrence State Hospital is located in the city of Ogdensburg, about 3 miles northeast of the center of the city, on a point of land which extends into the St. Lawrence river. The area of the land owned for use in connection with the hospital is 1292.25 acres. There are 55 occupied buildings. About 25 of these are used as wards for patients, the remainder being used as employees quarters and for industrial and other purposes.

The hospital receives as patients insane persons, except criminal insane, from the counties of Clinton, Essex, Franklin, Jefferson, Lewis, Onondaga,

Oswego and St. Lawrence. The certified capacity of the hospital is 1,846 patients. At the time of the inspection the population was 2,237 patients and 366 employees, a total of 2,603.

An examination of the sanitary condition of the hospital was made on May 3 and 4, 1917. As a result of this investigation certain insanitary conditions were found to exist and the report covering in detail the results of the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That in view of the insanitary condition of the plumbing as pointed out in detail in the body of this report

(a) Where the waste or soil pipes or the plumbing fixtures are not back vented suitable ventilation be provided for them.

(b) All of the obsolete types of fixtures, such as the long hopper, wash down, flush closets be replaced by modern sanitary fixtures.

(c) More plumbing fixtures be provided where needed in accordance with the standard given in the body of this report.

2. That softened water be provided for the laundry.

3. That since it is apparent that the institution is overcrowded to such an extent that it cannot satisfactorily care for the present number of patients, more room be provided either by additions to the present buildings or by erecting new ones.

4. That in view of the insanitary condition caused in the cow barn by leakage through the floor of the horse stable above, suitable place be provided elsewhere for the horses, and that no stock be kept in the stables over the cow barns.

(Utica) Utica State Hospital

The Utica State Hospital is located in the western portion of the city of Utica, about 1 mile from the N. Y. C. R. R. station. Approximately 1½ miles southeast of the hospital proper is located a farm called Graycroft, and about 6 miles northwest near Marcy is a tract of 1,000 acres of land owned for use of the hospital. The total area of the land used in connection with the hospital is 1,402 acres. At the institution proper there are 18 buildings occupied as wards, employees quarters, industrial building, assembly hall and kitchen, and in addition to these there are 23 accessory buildings. At Graycroft farm there are 1 main building and 15 farm buildings. At the other farms there are 3 buildings occupied by inmates and employees and several buildings used for farm purposes.

The hospital receives as patients insane persons, except criminal insane, from the counties of Fulton, Hamilton, Herkimer, Montgomery, Oneida, Onondaga, Saratoga, Schenectady and Warren. The certified capacity of the hopital is 1,382. At the time of the inspection the total population was 1,910, made up of 1,585 patients and 325 employees.

An examination of the sanitary condition of the hospital was made on January 16 and 17, 1917. As a result of this investigation certain insanitary conditions were found to exist and the report covering in detail the results of the inspection contained the following conclusions and recommendations.

Conclusions and recommendations

1. That the institution authorities immediately proceed with the arrangements necessary to obtain a new and adequate supply of water of good sanitary quality at the main buildings of the institution either by the development of a new source by the institution or by making arrangements for the use of water from the city system.

2. That, pending a new supply, every precaution be taken to prevent accidental or wilful pollution of the well by adequately fencing off the

property upon which the well is located and by prohibiting trespassing and strictly enforcing such a prohibition.

3. That the hospital authorities keep a close watch upon the sanitary conditions around the shacks in the neighborhood of the well in order that a proper sanitary disposal of excretal matters shall be carried out.

4. That the well furnishing the water at the Woodside Farm be abandoned and another supply satisfactory in quality and quantity be provided.

5. That the springs which are subject to contamination at the Overlea Farm be abandoned and another supply not subject to contamination be provided instead if necessary.

6. That the hospital authorities consider the installation as soon as practicable of a sewage disposal plant for the treatment of the sewage from the institution proper, plans for which should be submitted to this Department for approval, as required by the Public Health Law.

7. That suitable sewage disposal works be provided at the various farms conducted by the institution, plans for which should be submitted to this Department for approval.

8. That better ventilation be provided in the amusement hall.

9. That more room be provided for ward space either by providing new buildings or additions to the present ones, unless the number of patients at the institution can be reduced to eliminate the overcrowding.

10. That the heating systems and hot water systems be placed in good repair and so maintained.

11. That wherever the electric wiring is defective and constitutes a danger from fire it be replaced by proper wiring.

PRISONS AND HOSPITALS FOR INSANE CRIMINALS

(Auburn) Auburn State Prison

The Auburn State Prison is located on the north bank of Owasco river approximately in the center of the city of Auburn, Cayuga county, N. Y. The prison affords accommodations for 1,287 male and 150 female convicts. At the time of the inspection the total population was 1,626, made up as follows: Inmates, 1,357 men; 103 women; 166 employees. The area of the grounds is 13.5 acres. There are 18 occupied buildings all enclosed by a stone wall.

An examination of the sanitary condition of the prison was made on January 22 and 23, 1917. As a result of this investigation certain insanitary conditions were found to exist and the report covering in detail the results of the inspection contained the following conclusions and recommendations.

Conclusions and recommendations

1. That owing to the unsatisfactory state of repair of many of the buildings, especially in regard to the condition of floors and ceilings, these buildings be repaired and renovated and placed in a sanitary condition.
2. That in view of the insanitary condition of the plumbing and inadequacy of fixtures in many cases:
   (a) The plumbing system be generally repaired and renewed where necessary in order to eliminate old unsatisfactory joints in the pipes and provide proper venting, renew old fixtures, etc., and place the system in a satisfactory sanitary condition throughout.
   (b) Where insufficient plumbing fixtures are provided a sufficient number of sanitary fixtures be provided.
   (c) That the toilets and toilet fixtures be kept clean and sanitary at all times.
3. That in regard to sewage disposal.
   (a) The sewer system in the women's division be connected with the general sewer as indicated by the plans previously approved by this Department.
   (b) That the sewage screenings both from the bucket house and sewage screening chamber be stored in covered barrels, be removed daily and be either burned or buried at some point where insanitary conditions will not be created.
4. That in view of the inadequate and unsatisfactory means of ventilation found as pointed out above in detail, proper methods and more adequate ventilation be provided in all cases.
5. That in view of the dangerous sanitary quality of the water supply derived from the Owasco outlet, this water be used only, if at all, for boilers and for flushing purposes or in such places as the water would in no way be exposed or accessible to the employees and inmates.
6. That as the use of the Owasco outlet supply constitutes a constant menace to the health of the employees and inmates, serious consideration be given to the absolute abandonment of the outlet supply.
7. That where the 6-inch main of the city supply crosses the 8-inch main, a cross connection be installed thus providing better circulation through the distribution system.

(Auburn) Auburn State Prison Farm

The Auburn State Prison Farm which is leased by the Prison Department to be used in connection with the Auburn State Prison, is located adjacent to the northerly boundary line of the ciy of Auburn in the town of Throop, Cayuga county, N. Y. The buildings consist of a farm house occupied by

the keeper and his family, a barn and stable and a bunk house for the accommodation of the convicts quartered at the farm. The last named building was not complete at the time of the inspection.

On April 25, 1917, the Superintendent of Prisons requested that an examination be made of the water supply at the farm. In response to this request an inspection of the sanitary condition of the farm was made by a representative of this Department on June 9, 1917. As a result of this investigation it was found that certain insanitary conditions existed and the report giving the results of the examination contained the following conclusions and recommendations:

Conclusions and recommendations

1. That all use of the spring in the field near the stream be abandoned and that the other sources of water supply be properly protected against pollution or that a new water supply to furnish an adequate supply of water of safe sanitary quality be installed for the farm.
2. That proper toilet facilities be provided for both the convicts and other persons at the farm.
3. That the cows be excluded from the stream into which the effluent from the disposal plant of the city of Auburn discharges.
4. That proper facilities, including a milk house, be provided to produce a milk of safe sanitary quality.
5. That proper fire protection be provided for the farm buildings.
6. That the buildings be repaired where necessary.

(Beacon) Matteawan State Hospital

The Matteawan State Hospital is located on a hill about 1 mile north of the city of Beacon, Dutchess county, N. Y., and 1¾ miles east of the east bank of the Hudson river. About 484 acres of land are owned for the use of the hospital. The buildings are divided into 2 main groups known as the men's group and the women's group. The men's or main group consists of 12 buildings connected by corridors used for the accommodation of inmates and employees and the laundry and power house. The women's group located to the east of the main group is not yet completed and at present consists of 2 wards connected by a corridor.

The institution receives insane persons committed by order of courts of criminal jurisdiction and persons convicted of petty crimes, not felons, becoming insane while undergoing sentence, also patients in other State hospitals still exhibiting criminal tendencies. At the time of the inspection the total population was 1,117, made up of 904 inmates and 213 officers and employees.

An examination of the sanitary condition of the hospital was made on September 11, 1917. As a result of this investigation certain insanitary conditions were found to exist and the report covering in detail the results of the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That the overcrowded condition of the institution be relieved at once by
   (a) The completion of the women's group of buildings.
   (b) The construction of additional wards which should have not less than 600 cubic feet of air space and 50 square feet of floor space for each patient.
2. That a new laundry provided with proper ventilation facilities be constructed.
3. That the new kitchen planned in connection with the women's group be constructed.
4. That the old iron hopper closets and the iron lavatories be replaced by modern porcelain fixtures.

5. That all the toilet rooms be provided with floors of nonabsorbent material.

6. That ward 8-A be replaced by a permanent building.

7. That the kitchen, dining rooms and hospital wards be screened during the summer.

8. That the outfall sewer be extended to discharge beyond the fill made by the brick yard south of it.

9. That an additional pump located in a separate or in a fire-proof building be installed and properly connected for use in case of fire.

10. That the storm and sanitary sewage be separated and that the sanitary sewage be given preliminary treatment before being discharged into the river.

(Comstock) Great Meadow Prison

Great Meadow Prison is located in the town of Fort Ann, Washington county, N. Y., near the unincorporated village of Comstock. The area of the grounds is 998 acres. There are fourteen occupied buildings, 5 included in the main group comprising the cell block, cage, dormitory and domestic buildings, bath house and power house; and 9 used as residences for officers and guards.

The prison receives male felons transferred from other prisons. At the time of the inspection the population consisted of 756 inmates, 56 officers and attendants, a total of 812. The capacity of the institution is 1,168 inmates.

An examination of the sanitary condition of the institution was made on January 10 and 11, 1917. As a result of this investigation certain insanitary conditions were found to exist and the report covering in detail the results of the inspection contained the following conclusions and recommendations:

Conclusions and recommendations

1. That the work of removing the vegetation and muck from the bottom and shores of Dolph pond and other measures for developing and protecting the supply be completed as rapidly as possible.

2. That the water supply derived from Dolph pond be temporarily chlorinated while work is being carried on at the pond or upon its watershed which may seriously pollute the supply.

3. That every precaution be taken against any possibility of contamination of the water supply derived from the driven well, and that when the necessary repairs and improvements are made to utilize more fully the Dolph pond supply, the use of the driven well be discontinued.

4. That sanitary privies constructed with removable containers and properly protected against flies be constructed as rapidly as possible and be used where necessary on the institution grounds.

5. That the sewage disposal plant be repaired and put in service in accordance with the following recommendations, nearly all of which are included in previous reports.

(a) That a water pipe be constructed to the disposal plant and provision be made for flushing out the sludge.

(b) That the siphon chamber and siphons therein be placed in proper operating condition and that if it is not possible for the attendant to do this that a mechanic from the manufacturers be sent for and the plant be put in good working order throughout.

(c) That the area of the sand beds be increased to double the original size, that intermediate underdrains, which, together with existing underdrains should be properly covered with fine gravel, be placed between the existing underdrains and also that the sewage be applied to the beds intermittently by the siphons.

(d) That when a sand bed appears to be clogged it be cut out of use, the scum be allowed to dry and be removed, and that the sand beds be ridged during the first part of December for the winter, each year.

(e) That the large sludge bed and the small excavated area be converted into three properly underdrained sludge beds and provision be made to apply sludge to one or more of them as desired.

(f) That no unfiltered sewage or sludge be discharged into the brook under any consideration.

(g) That the sewage and wastes from the warden's residence and from the barns and milk room either be disposed of by connections to the present disposal plant or that they be conducted to the settling tank, the overflow from which could be allowed to percolate into the soil from a series of subsurface tiling.

(h) That all roof leaders, catch basins and other storm water appurtenances where it is found that these are connected with the sanitary sewers be disconnected and be connected with the storm sewers.

6. That the ventilating system of the cell blocks be put in good working order.

7. That a hot water system be installed at the milk house.

8. That screens be provided for those doors and windows of the mess hall and kitchens which are not properly screened at present.

(Dannemora) Clinton Prison and Dannemora State Hospital

Clinton Prison and Dannemora State Hospital are located at the foot of a mountain in the northern part of the village of Dannemora, Clinton county, N. Y., which is reached from Plattsburg over the Plattsburg and Lake Placid branch of the D. & H. R. R. The area of the grounds at the prison and hospital is 625 acres, and there is considerable other land in the surrounding country owned for the use of the institutions. About 13 acres are enclosed in the prison stockade. Clinton prison occupies 15 buildings and Dannemora State Hospital occupies 10 buildings.

The prison receives male convicts and the hospital receives male convicts who have become insane. The capacity of the prison is 1,329 inmates and that of the hospital 450 inmates. At the time of the inspection the populations of the institutions were as follows: Clinton prison, inmates 1,306; employees, 130; total, 1,436. Dannemora State Hospital, inmates 550; employees, 109; total, 659. The total population of both institutions was 2,095.

An examination of the sanitary condition of the institution was made on April 30 and May 1 and 2, 1917. As a result of this investigation certain insanitary conditions were found to exist and the report covering in detail the results of the inspection contained the following conclusions and recommendations.

Conclusions and recommendations

1. That in regard to water supply

(a) The development of a water supply of safe sanitary quality and of adequate capacity for all present purposes and with a reasonable allowance for future growth be considered at once.

(b) Steps be taken to remove all sources of pollution from the watersheds as soon as possible.

(c) That ice cutting be discontinued on reservoirs which are used for water supply.

(d) The spring supplying the warden's residence, the well and other sources of water be properly protected against contamination.

2. That in regard to sewerage and sewage disposal:

(a) Screen chambers be installed in the sewers near the institution and that these chambers be properly constructed and maintained.

(b) That the sewers which are now broken be repaired.

(c) That a properly constructed sludge bed be provided for use in connection with the settling tanks, and that the sludge from the tanks be dried on this bed, and the dried sludge disposed of in a satisfactory manner.

(d) That additions be made to the disposal plant to provide for more complete treatment of the sewage.

(e) That the use of privies be discontinued wherever possible. Where it is necessary to use a privy, I would recommend that it be located where a water supply will not be endangered, be properly screened against flies and be maintained in a sanitary condition.

3. That a greater number of toilet fixtures be provided in Clinton prison, as indicated in the report, and that the plumbing in the shops of the prison, which is old and not properly constructed, be replaced by modern plumbing.

4. That adequate ventilation be provided in the shops and kitchen of the prison.

5. That the cow barn of the prison be screened, the manure be removed at intervals of not more than a week, and every precaution be taken to protect the sanitary quality of the milk.

6. That a new laundry, properly equipped and of adequate size, be built for use in connection with the prison as soon as possible.

7. That additions be made to the plumbing fixtures of the hospital according to the standard indicated in the body of the report.

8. That the conditions of overcrowding at the hospital be eliminated by the construction of additional buildings.

9. That in regard to the milk supply of the hospital:

(a) More land be purchased as soon as possible and the herd of cows be increased to such an extent that the milk supply of the institution may be obtained from its own herd.

(b) That a more modern and properly constructed dairy barn and milk room be built for the proper handling of the milk.

(c) That the cows be tested for tuberculosis.

(d) That in the meantime proper inspection be made of the source of the milk purchased, and that this milk be made to conform to the standard of good sanitary quality.

(Valatie) State Farm for Women

The State Farm for Women is located in the town of Kinderhook, Columbia county, N. Y., about half-way between Valatie and Niverville. The occupied buildings consist of one house occupied by the inmates, one by the warden, one by the farmer, and one by three or four convicts from Great Meadow prison. In addition to these there are the usual farm buildings and sheds.

The institution receives women over 30 years old convicted of a misdemeanor or an offense of lesser character, at least five time in two years. At the time of the inspection the population consisted of 76 regular inmates, 6 convicts from Great Meadow prison, and 5 attendants, a total of 87. The capacity of the institution when completed will be 600.

An examination of the sanitary condition of the institution was made on January 5, 1917. As a result of this investigation certain insanitary conditions were found to exist, and the report covering in detail the results of the inspection contained the following conclusions and recommendations.

Conclusions and recommendations

1. That the development of an adequate supply of water of good sanitary quality for the institution be completed as rapidly as possible. I would also recommend that, in the meantime, no water for drinking or cooking be taken from the well near the barns or from the spring near the warden's residence.

2. That the sewage disposal works be reconstructed and extended to conform with the plans approved by this Department.

3. That plans for sewerage, sewage disposal and water supply for the warden's residence be submitted to this Department for approval as required by section 14 of the Public Health Law.

4. That adequate toilet facilities and proper means for personal cleanliness among the workers be provided at the barns and at the farm house.

5. That all privies be discontinued wherever practicable. Where it is necessary to maintain a privy, I would recommend that it be located in such a place as to eliminate all danger of the pollution of a water supply, and that it be properly constructed so as to be inaccessible to flies and be maintained in a sanitary condition.

6. That adequate barns and stables be constructed which should include a milk house properly built and equipped for the care of the milk.

7. That additional capacity be provided at the institution if the present or a greater number of inmates is to be cared for.

OTHER INSTITUTIONS

(Chester) Farm Colony for Women Offenders

An inspection of a proposed site for a Farm Colony for Women Offenders was made on July 11, 1917, pursuant to the receipt of an application, dated June 30, 1917, of Commissioner B. G. Lewis, of the Department of Correction of the city of New York, for the approval of this site by the State Commissioner of Health, in accordance with the provisions of chapter 510 of the Laws of 1916.

The proposed site, known as the Steadman farm, is located in Orange county, near the Greycourt station of the main line of the Erie railroad, 55 miles northwest of Jersey City. The nearest village is Chester, about 2 miles distant.

The farm contains 257½ acres and is bounded on the northwest by the Lehigh and Hudson railroad, and on the southwest by the main line of the Erie, while the Newburgh branch of the Erie passes through the property. The Greycourt station of the Erie railroad is at the southwest corner of the property.

Approximately one-third of the area consists of a moderately steep side hill near the top of which it is proposed to locate the principal buildings of the institution, the remaining two-thirds of the area being low, level land, devoted mainly to pasturage. Through this lower level two streams pass, known as Seeley creek, and the main ditch, respectively, which unite beyond the northerly boundary of the property to form Cromline creek, which in turn joins the Otterkill near Washingtonville to form Moodna creek, which is a tributary to the Hudson at Cornwall. A detailed description of the site with reference to the character of the various soils found thereon, is given in the report of Mr. William Goldsmith, construction engineer, submitted with the application of Commissioner Lewis.

From a sanitary standpoint the site seems to be well adapted for an institution, the high ground being suitable for various buildings and the low ground for truck gardens or pasture. The present farm buildings are supplied with water from the public water supply of Chester, through a 2-inch line tapping the main line from Walton lake, the source of the Chester supply,

to the village. The elevation of Walton lake, according to the United States geological survey map, is 707 feet above sea level, while that of the highest point on the proposed site is approximately 540 feet, giving a difference of elevation of 167 feet, this difference in head insuring ample pressure for domestic purposes and fire protection providing the mains be of sufficient size. Although the streams draining the property are not tributary to any public water supply it is evident that on account of their small size some degree of purification would be required for the sewage from the institution. An ample fall can be secured for sewer lines and the sewage disposal plant could undoubtedly be located at a satisfactory point well remote from the buildings.

While the water supply from Chetser is derived from a source free from gross contamination, its sanitary quality is menaced during the summer by numerous summer cottages located around its shores, and by the use of the lake for bathing, swimming and general pleasure purposes. Before this supply is used for the institution, it would be advisable for it to be sterilized, during the summer at least, with liquid chlorine.

In view of the above facts it was recommended that the site be approved, provided a proper and satisfactory sewage disposal plant is installed, and provided the water supply obtained from Chester is either chlorinated by the village of Chester at the Walton lake intake, or by the institution before local distribution throughout the colony.

INVESTIGATION OF SEWAGE DISPOSAL PLANTS

During 1917 the work of investigating municipal sewage disposal plants and works for treatment of trade wastes has been carried on to the extent permitted by the press of other work of the Engineering Division, such as investigation of public water supplies and other special work.

This investigation, however, has necessarily been limited, principally, to the inspection of certain sewage disposal plants concerning which plants complaints have been received at the Department or which were involved in questions of public water supply.

The method of carrying out the investigation of these plants has been similar to the methods employed in the three preceding years during which time the work has been carried on, as discussed in previous annual reports of the Department, and has been briefly as follows:—A close description of the construction and operation of the plants has been obtained in the field by one of the Assistant Engineers and, by means of a field laboratory or through the cooperation of the Division of Laboratories and Research, both chemical and bacterial analyses of raw sewage and of plant effluent, as well as of the waters of streams both above and below the point of discharge of the effluent have been obtained in most of the investigations. In each case careful observations have been made of the physical effect on the stream of the discharge of effluent from the plant and after a study of the results of the investigation has been made a copy of the report containing recommendation for any improvements necessary in the construction and operation of the plant has been transmitted to the local authorities.

While it has not been possible owing to limited force, to make reinspections of all plants where recommendations for improvements have been made, it may be stated that, in general, prompt action is taken by municipal authorities to carry out the recommendations and requirements of the Department.

The reports on the investigations of sewage disposal plants are given below:—

BALLSTON SPA

(American Hide and Leather Company)

Inspections and tests of the operating efficiency were made during 1916 and 1917 of the plant installed at the tannery of the American Hide and Leather Company at Ballston Spa, for the treatment of wastes from the tannery. These tests are discussed in the report on the examination of plans appearing on page 250 of this report.

BEDFORD HILLS

Fourth memorandum report regarding inspection of sewage disposal plant at the New York State Reformatory for Women at Bedford Hills.

This investigation was made on November 9, 1916, at the request of the Commissioner, by Mr. M. F. Sanborn, assistant engineer, in order to determine the condition and operation of the sewage disposal plant at this institution. The investigation consisted of a general inspection of the plant and of chemical and bacteriological analyses of the raw sewage of the different effluents and of the brook water at various places above and below the discharge of the effluent.

The total population at the institution was about 460. The average day flow of sewage was at the rate of about 85,000 gallons per day, while the average daily flow for the 24-hour period was about 56,000 gallons, or about 122 gallons per capita per day. The flow in the brook at the time of the inspection was about 4 cubic feet per second, which corresponds to about 8 cubic feet per second per square mile.

With reference to suggested changes recommended in memorandum report of February 19, 1916, and April 12, 1916, it was found that none of the following recommendations had been carried out:

1. That manholes be constructed at each end of the main collecting pipe for purpose of inspection and cleaning.
2. That a sump manhole or sand catcher be constructed on the main drain pipe directly east of the chlorination plant.
3. That blind drains be constructed from the ends of the main drain pipe along the westerly sides and thence along the southerly and northerly sides respectively of the southwest and northwest beds.

Each inspection has brought out the necessity of these changes and at present a temporary dam has been placed in the manhole on the main drain pipe from the sand filters, in order that sand washed from the beds may be settled, in the comparative still water above this dam. With beds 1, 2, 7 and 8 in use about two pails of sand are removed each day, and with the other four beds in use about one pail of sand is removed every two or three days. Some sand also passes over the dam and is deposited in the diffusion chamber from where it has to be removed. On account of the depth and small size of this chamber the removal of this sand is difficult and any accumulations of sand in this chamber may somewhat reduce the efficiency of the chlorination treatment. The dam in the drain pipe from the sand filters may eventually cause the complete silting up of this drain and thereby necessitate the pipe being dug up and cleaned.

In the former reports it was recommended that at least one cylinder of liquid chlorine be always in reserve at the institution to be used in case of

emergency. Twice since the last inspection the supply of liquid chlorine has run out and bleach has temporarily been used. The chlorine apparatus is provided with two tubes, so that when one cylinder has been emptied the feeding may be automatically diverted to a full cylinder. Since there is only one tank attachment this cannot be done and the supply of chlorine has to be temporarily shut off while changing the attachment from one tank to another.

An inspector from the board of water supply, gas and electricity visits the plant each day and reads the high and low pressure gage of the chlorine apparatus, the temperature of the chlorine room, condition of fire in room, weight of chlorine cylinder in use and the amount of chlorine gas used. The plant is also visited occasionally by one or more of their engineers. Samples of the various effluents and brook water are collected each Monday and analyzed at the Mt. Kisco laboratory.

In order to determine the efficiency of the operation of the plant, samples of the raw sewage, various effluents and brook water were collected and analyzed. The results of these analyses, together with those made at the previous inspections, will be found in the accompanying table. (See Fifth Memorandum Report following.)

The operating efficiency of the different units of the plant may be seen by the results of the analyses and may be stated as follows:

The strength of the raw sewage as shown by the turbidity and oxygen consumed test appears to be somewhat less than during the previous inspection, and this is apparently due to the larger water consumption occurring at this time.

The tank effluent showed a reduction of about 58 per cent of organic matter from that in the raw sewage as determined by the oxygen consumed and turbidity tests and also some reduction in the total count of bacteria. These results indicated a much greater reduction of organic matter than on either of the previous inspections.

The sand filter effluent contained 2.8 parts of oxygen consumed and showed a reduction of 90 per cent of organic matter from that found in tank effluent. There was considerable nitrification going on in the sand filters, as shown by the 8 parts of nitrates. The total count of bacteria was much lower than on the previous tests, although those of the B. coli type were somewhat more prevalent.

The sand filter effluent after sterilization gave results practically the same as during the previous inspections, although the amount of nitrates was naturally greater on account of the greater amount of nitrates in the sand filter effluent. This sterilized effluent contained only 3 bacteria per cubic centimeter and no organisms of the B. coli group were present in the three 10 c.c. inoculations tested. The samples in the putrescibility test were stable, only one-third of a day, but this is undoubtedly due to the fact that there was some residual chlorine in the effluent which very rapidly reduced the coloring matter.

The sample of the water taken about 800 feet above the discharge of the effluent showed some pollution by the amount of oxygen consumed and chlorine present, by the high counts of bacteria and by the presence of organisms of the B. coli group in one of the 1 c.c. inoculations.

The samples taken 300 feet and one-half mile below the discharge of the effluent showed considerable lower total counts of bacteria and no organisms of the B. coli group in the 1 c.c. inoculations. The reduction in bacteria and organisms of the B. coli group in the brook water is undoubtedly due to the residual chlorine in the final effluent from the disposal plant.

As a result of the investigation of this plant and after a careful examination of the conditions of operation and the results of the analyses of the different effluents and of the brook water the following summary and conclusions are drawn:

1. That the three changes recommended in the former reports and mentioned above have not been carried out.

2. That twice since the last inspection the supply of liquid chlorine has run out and temporary application of bleach have been made at those times.

3. There being but one attachment to the chlorine cylinder the supply has to be temporarily shut off while the attachment is being changed from an empty to a full cylinder.

4. That the application of chlorine to the final effluent proved very effective not only reducing the total count of bacteria to from 3 to 7 per c.c., but also eliminating the B. coli as shown in the analyses and furthermore it has in the case of the last two tests reduced the total count of bacteria in the water in the brook passing the disposal plant from 60 to 70 per cent.

In view of the results of this investigation the following recommendations may be presented:

1. That the changes recommended in previous reports and mentioned above be carried out, in order that the operation of the disposal plant may at all times be effective.

2. That the former recommendation in regard to the keeping of one full cylinder of chlorine in reserve at the institution be carried out, and that an extra tank attachment be secured, in order that the flow of chlorine from a cylinder when empty may be automatically diverted to a full cylinder.

February 8, 1917

Fifth memorandum report regarding inspection of sewage disposal plant at the New York State Reformatory for Women at Bedford Hills.

This investigation was made on August 14, 1917 to determine the condition and operation of the sewage disposal plant at the institution and also since a request had been made by the Superintendent for an inspection to determine if recommendations made by this report had been carried out.

The total population was about 500. The average daily flow of sewage was at the rate of about 94,000 gallons per day while the total flow for 24 hours was about 62,000 gallons. The flow in the brook was about 2 cubic feet per second which corresponds to about .4 cubic feet per second per square mile.

With reference to suggested changes recommended in the fourth memorandum report it was found that all of the suggested changes in construction and operation had been carried out, namely: the observation manholes at each end of main collecting pipe, the sump manhole or sand catcher on main drain pipe directly east of chlorination chamber and the blind drains from the ends of the main drain pipe along the westerly sides and thence along the southerly and northerly sides respectively of the southwest and northwest beds have been constructed.

One full cylinder of chlorine is kept in reserve at the institution and an extra tank attachment has been secured so that an empty cylinder may be cut out and a full cylinder of chlorine put in use without cutting off the flow.

Samples of the effluent of the plant and of the water of the brook into which the effluent discharges were taken on August 14, 1917, and the results of the bacterial examination of these samples indicate that the plant is being efficiently operated.

November 1, 1917

RESULTS OF ANALYSES OF SEWAGE AND SEWAGE EFFLUENTS AND BROOK WATER

Municipality	County	Source of sample	Date of collection	Imhoff cone c.c. in 1 hour	Turbidity	Temperature	Dissolved Oxygen		Nitrates	Oxygen consumed	Chlorine	Putrescibility, days,	Bacteria per cc. agar 20° 48 hours	B. Coli Type + = present — = absent				
							Parts	Percent of saturation						10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.	1-1000 c.c.
Bedford Hills New York State Reformatory for Women	Westchester	Raw sewage	Jan. 24 and 25, 1916	4.5	300	62	2.0	30	+ .3	+48	+35	1	170,000	.....	.....	.....	.....	.....
"	"	Tank effluent (3 tanks)	"	3.0	130	55	0.1	1	+ Tr.	+44	+40	½	6,000,000	.....	.....	.....	.....	.....
"	"	Sand filter effluent	"	....	Cl.	40	5.9	46	+ .9	+6.8	+40	7+	250,000	3+0—	3+0—	0+3—	.....	.....
"	"	Sand filter effluent sterilized	"	....	Cl.	40	6.0	49	+2.0	+6.8	+35		7	0+3—	0+3—	0+3—	.....	.....
"	"	Brook (200′ above)	"	....	Cl.	34	6.9	49	+ .6	+5.0	+ 4	7+	1,450	3+0—	3+0—	1+2—	.....	.....
"	"	Brook (300′ below)	"	....	Cl.	34	6.9	49	+ .8	+5.0	+ 5	7+	2,180	3+0—	2+1—	0+3—	.....	.....
		+24 HOURS COMPOSITE SAMPLES																
"	"	Raw sewage	April 6, 1916	4.0	200	58	2.0	19	.....	102	40	¾	1,360,000	.....	.....	.....	.....	.....
"	"	Tank effluent, first tank	"	0.7	180	58	0.9	9	.....	.....	....	.....	.....	.....	.....	.....	.....	.....
"	"	Tank effluent, second tank	"	0.2	160	56	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
"	"	Tank effluent, third tank	"	0.1	140	56	.....	.....	.....	58	40	⅛	2,600,000	.....	.....	.....	.....	.....
"	"	Sand filter effluent	"	....	Cl.	42	5.7	45	3.0	2.8	45	.....	2,300	.....	2+1+	0+3—	0+3—	.....
"	"	Sand filter effluent sterilized	"	....	Cl.	44	6.8	55	.....	2.2	50	.....	4	0+3—	0+3—	0+3—	.....	.....
"	"	Brook (800′ above)	"	.....	.....	.....	.....	.....	.....	3.7	4	.....	5,400	3+0—	3+0—	0+3—	0+3—	.....
"	"	Brook (200′ above)	"	....	Cl.	47	6.9	59	.....	3.7	4	.....	4,000	3+0—	2+1—	2+1—	0+1—	.....
"	"	Brook (300′ below)	"	....	Cl.	47	6.5	57	.....	3.7	4	.....	1,800	3+0—	3+0—	2+1—	0+3—	.....
"	"	Brook (½ mile below)	"	.....	.....	.....	.....	.....	.....	3.6	45	.....	1,800	3+0—	2+1—	0+3—	0+3—	.....
"	"	Raw sewage	Nov. 9, 1916	....	160	64	.....	.....	.....	66.7	47	½	920,000	.....	.....	.....	.....	.....
"	"	Tank effluent	"	....	95	62	.....	.....	0.1	28.3	55	⅓	780,000	.....	.....	.....	.....	.....
"	"	Filter effluent	"	....	Cl.	56	4.3	41	8.0	2.8	60	Stable.	475	.....	.....	3+0—	2+1—	0+3—
"	"	Sterilized effluent	"	....	Cl.	56	7.5	71	8.8	2.0	65	⅓	3	0+3—	0+3—	0+3—	0+3—	.....
"	"	Brook (800′ above)	"	....	Cl.	46	6.8	53	.....	2.6	6.0	Stable.	7,900	.....	1+2—	0+3—	0+3—	0+3—

RESULTS OF ANALYSES OF SEWAGE AND SEWAGE EFFLUENTS AND BROOK WATER — *Concluded*

Municipality	County	Source of sample	Date of collection	Imhoff cone c.c. in 1 hour	Turbidity	Temperature	Dissolved Oxygen		Nitrates	Oxygen consumed	Chlorine	Putrescibility, days	Bacteria per cc. agar 20° 48 hours	B. Coli Type + = present − = absent				
							Parts	Percent of saturation						10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.	1-1000 c.c.
Bedford Hills New York State Reformatory for Women	Westchester	Brook (300 below)	Nov. 9, 1916	....	Cl.	46	6.1	51	2.9	2.9	7.5	Stable.	2,400	.....	0%3−	0%3−	0%3−	.....
"	"	Brook (½ mile below)	"	....	Cl.	46	6.1	51	.....	3.5	6.5	Stable.	2,400	.....	0+3−	0+3−	0+3−	.....
"	"	Sand filter effluent	Aug. 14, 1917	....	.....	.....	.....	.....	.....	.....	.....	.....	48,500	.....	.....	3+0−	3+0−	0+3−
"	"	Sand filter effluent sterilized	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	0+3−	0+3−	0+3−	.....
"	"	Brook (800′ above)	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	110	.....	3+0−	0+3−	0+3−	.....
"	"	Brook (300′ below)	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	0+3−	0+3−	0+3−	.....
"	"	Brook (½ mile below)	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	238,000	.....	3+0−	3+0−	1+2−	.....

FULTONVILLE

Memorandum regarding inspection of condition of operation of the sewage disposal plant of the village of Fultonville, Montgomery county

An inspection of this disposal plant was made on March 9, 1917, by Mr. M. F. Sanborn, assistant engineer, who was assisted by Mr. Edward Gilbert, president of the village, and Dr. O. Z. Bouton, health officer of the village.

Location.— The disposal plant is located about one-half mile east of the village on the south bank of the Mohawk river.

Population.— Estimated at about 1,000 at the time of the inspection, about 60 per cent of these are served by the water supply and about 50 per cent by the public sewer system and disposal plant.

Water supply.— Obtained from a driven well in the western part of the village near the Mohawk river. Estimated consumption 90,000 gallons per day.

Sewer system.— About 5 miles of sanitary sewers varying from 6 inches to 15 inches in diameter.

Sewage flow.— Estimated at about 80,000 gallons per day.

Disposal plant.— Two rectangular settling tanks.

Effluent.— Effluent from disposal plant is discharged into Mohawk river.

Settling tanks.— The 2 settling tanks are 6 feet wide and 50 feet long and have an available depth of 5.7 feet. Each tank has a capacity of 12,825 gallons and a theoretical detention period of about 4 hours.

Remarks.— Only one of the two tanks has been used since the plant was constructed and the one in use was practically filled with sludge and scum. This tank has never been cleaned since it was placed in use in 1910 while the other tank which has never been used was free of any scum or sludge.

The village president stated that he would have the tank which had been in use cut out of service and the other tank placed in service and that the cleaning of the tank containing the sludge would be left to the new board of trustees which would come into office in a very short time.

Recommendations

It is recommended that a letter be sent to the board of trustees calling attention to the neglected condition of the disposal plant and recommending that the plant be always maintained satisfactorily and that at no time should more than one-third of a tank be occupied with scum or sludge. The sludge removed from the tank should be buried or placed on a dump and under no circumstances should it be placed in the river or where it may be readily washed into any river or brook.

A communication was addressed on April 3, 1917 to the board of trustees calling attention to the improper condition of the disposal plant and requesting that steps be taken to place it in proper operating condition.

April 3, 1917

GOSHEN

Memorandum regarding inspection of conditions of operation of sewage disposal plant for the village of Goshen, Orange county

An inspection of this sewage disposal plant was made by Mr. M. F. Sanborn, assistant engineer, on October 5, 1916.

Designing engineer.— Mr. Clyde Potts, consulting engineer of New York city.

The plans were approved.— January 13, 1914.

Date of construction.— Plant completed and placed in operation about October 5, 1915.

Location of works.— About 1½ miles west of the village of Goshen, on a tributary to the Wallkill river.

Population.— The population at the time of the inspection was estimated to be about 3,511 and the population as given in 1910 was 3,081.

Water supply.— The water supply is taken from a tributary of Wallkill river, the intake being about 1½ miles south of the village and about 3 miles above the location of the disposal plant.

Sewer system.— About 10 miles of sanitary sewers varying from 8 to 18 inches in diameter.

Sewage flow.—Estimated at the time of the inspection to be about 216,000 gallons per day and it is probable that only about one-half of the village was being served by the sewer system and disposal plant at that time.

Disposal plant.— 3 settling tanks, dosing tank, 4 sand filters and a sludge bed.

Effluent.— The effluent from the disposal plant is discharged into a tributary of the Wallkill river. The watershed above the point of discharge of the effluent is three square miles.

Settling tanks.— There are 3 settling tanks, all of them are 85 feet long and have an average depth of about 8 feet. The tanks are all different widths, the small one being 10 feet, the next 12 feet and the largest one 14 feet. The capacities are about 51,000, 61,200 and 71,400 gallons respectively and each tank giving a theoretical detention period with the amount of sewage flowing as found during the inspection of about 5.7, 6.9 and 8 hours respectively. At the time of the inspection the largest tank was in use.

Dosing tank.— This tank is 30 by 60 feet in plan and has an available depth of 2½ feet and a capacity of about 31,000 gallons which is equivalent to a storage of about 3½ hours. Automatic dosing arrangements are provided in the gate house located on one side of the tank and the contents of the dosing tank are alternately discharged on to each of the four sand filters.

Sand filters.— The sand filters are 100 by 210 feet in plan and contain about 3 feet of sand having an effective size of about .42 mm. and a uniformity coefficient of about 4.7. Each filter has an area of about .48 acre thus giving a total area of 1.92 acres. The sewage is distributed over each bed by means of a trough running through the center of each bed and having openings with gates in side every 34 feet to permit a portion of the sewage to pass out upon the beds at the various openings. The underdrainage consists of various lines of 4-inch agricultural tile 6 feet between centers and draining toward a central drain which leads to the brook.

Sludge bed.— The sludge drying bed is 40 by 80 feet in plan, and contains about 18 inches of sand and 6 inches of gravel which is placed around the underdrains. The underdrains consist of 3-inch agricultural tile placed 4 feet center to center, leading to a main drainage pipe which conveys the effluent to the brook.

General remarks.— The large settling tank was in use at the time of the inspection and contained about 10 inches of scum and a small amount of

sludge. The middle size tank was not in use at the time of the inspection although it was full of sewage, there being about 6 inches of scum and a small amount of sludge. The smallest tank was empty and had apparently recently been cleaned since the sludge bed contained about 6 inches of fresh sludge.

Only about one-half of the area of the sand filters are covered with an application of sewage from the dosing tank due in part to the slow rate of flow from the tank and in part to the large effective size and uniformity coefficient of the sand which permits the sewage draining upon it to pass readily through the beds. One discharge from the dosing tank is sufficient to flood a sand filter about 2 inches.

The sand filters had all recently been harrowed and practically no scum was seen on the surface.

The brook showed various fungus and algae growths due to the presence of the effluent and the stream looked much worse than it should with a good sand filter effluent discharging into it.

Recommendations

1. That if possible the rate of flow from the dosing tank to sand filters be increased so that the entire quantity may be discharged in a much shorter time than at present.

2. That when it becomes necessary to place new sand on surface of filters, to replace sand lost by scraping, sand having an effective size of from .3 to .35 mm. and a uniformity coefficient of not more than 2½ should be used.

February 27, 1917

HUNTINGTON

Memorandum regarding inspection of sewage disposal plant for sewer district in town of Huntington which includes the village of Huntington

An inspection of this plant was made by Mr. M. F. Sanborn, assistant engineer on October 25, 1916. The inspector was assisted at the time of the inspection by Mr. E. S. Ireland, chairman of the sewer commission; Mr. C. M. Felt, secretary and treasurer of the commission, and Mr. H. Parson, resident engineer.

Location.— Eastern part of Huntington and on Huntington Bay.

Population of sewer district.— Estimated at 5,000.

Water supply.— 12 wells 8 inches in diameter, about 60 feet deep, located in the eastern part of the village. Average daily consumption estimated at 400,000 gallons.

Sewer system.— 13 miles of sanitary sewers 8 to 15 inches in diameter.

Flow.— No flow since plant was not completed at time of inspection. The estimated amount of sewage which is expected will be from 100,000 gallons to 300,000 gallons per day.

Disposal plant.— 3 Imhoff tanks, 2 sludge drying beds, a sterilization plant and a tide storage chamber.

Effluent.— Effluent will discharge into Huntington Bay and Long Island Sound.

Imhoff Tank.— 3 rectangular tanks 11½ feet wide, 49⅓ feet long and having an effective depth of 11 feet. Each tank has 2 settling compartments and sludge digesting chamber has 5 compartments, the bottom of each compartment being hopper shape to facilitate removal of sludge. The 3 tanks will give a theoretical detention period of 2.8 hours with a daily flow of 300,000 gallons. Sludge digesting compartments have an available capacity of 3,000 cubic feet.

Sterilization.— An automatically controlled liquid chlorine apparatus furnished by Wallace & Tiernan is to be installed in the sterilization and valve chamber on the east side of the settling tanks. This chamber is about 12 by 18 feet in plan and the control of the storage tank is operated from this building. The permit required that not less than 5 parts per million of liquid chlorine be applied to the effluent from the settling tanks.

Storage tanks.— This tank is of concrete 38 feet by 78 feet in plan and 4½ feet deep and has a capacity of about 100,000 gallons. It is planned to discharge the sterilized effluent during the first 4 hours of ebb tide while the sewage flow during the rest of the day will be stored in this tank.

Sludge beds.— There are two sludge beds 20 feet by 30 feet in plan and each bed is filled with 12 inches of graded broken stone or gravel and covered with a thin layer of sand. Underdrains passing through the bottoms of these beds discharge effluent to storage tanks.

Remarks.— At the time of the inspection it was stated by the engineer that liquid chlorine was to be applied to the raw sewage, whereas the permit provided that chlorine be applied to effluent of settling tanks. A letter was therefore, written on November 9, 1916 to the commissioners calling attention to this fact.

April 16, 1917

KINGS PARK

(State Hospital)

HERMANN M. BIGGS, *State Commissioner of Health:*

I beg to submit the following report on an investigation of the sewage disposal plant of the Kings Park State Hospital, Suffolk county, made on October 24, 1916. This investigation was made by Mr. M. F. Sanborn, assistant engineer, in connection with the general investigation now being carried on of sewage disposal plants in the state and especially as a result of a request from the hospital authorities as to the advisability of using the sewage sludge for agricultural purposes.

Location and general description

Location.— In the northern part of Long Island and of the town of Smithtown, Suffolk county, and about 40 miles east of New York city, on the Long Island railroad.

Population.— The population at the time of the inspection was estimated to be about 4,356 patients and 750 employees, a total of 5,106.

Water supply.— Ten 8-inch driven wells about 490 feet deep, located in the rear of the old power station in the eastern part of the grounds.

Sewer system.— About 4 miles of sanitary sewers 6 and 8 inches in diameter.

Sewage disposal works.— Two screen chambers, 2 Imhoff tanks, a dosing tank, a sprinkling filter, a final settling tank and a sludge bed.

The Kings Park State Hospital is a hospital for the care of the insane and is under the supervision of the New York State Hospital Commission. At the time of the inspection there were about 4,356 patients and 750 employees, making a total of about 5,106. The number of inmates and employees varies somewhat, a year ago last February the population being about 5,267. The water supply of the hospital is obtained from 10 driven wells, 8 inches in diameter and about 490 feet deep. The water from these wells is pumped to a reservoir located on the hospital grounds and to the various buildings of the hospital. The daily consumption at the time of the inspection was estimated to be 700,000 gallons.

The sewer system consists of 4 miles of sanitary sewers 6 and 8 inches in diameter and 4 miles of storm water drains. All of the sanitary sewage is conveyed to the sewage disposal plant which is located in the eastern part of

the land within the hospital grounds. The average daily flow of sewage was estimated to be about 600,000 gallons per day which corresponds to a daily flow per capita of about 117 gallons. The sewage is a domestic sewage although there is an unusual amount of water used for laundry and washing purposes, and this use accounts somewhat for the fairly high per capita water consumption and the consequent weakness of the sewage.

The sewer system and disposal plant were designed by Herring & Fuller, civil engineers of New York under commission from the State Architect and the plans were approved by this Department on December 29, 1908. Revised plans also designed by Herring & Fuller were approved by this Department on June 28, 1912 and the present plant was remodeled and placed in service in 1913.

The effluent from the disposal plant is discharged into the Nissequogue river. This river is a tidal stream, having a rise and fall of about 6 feet and discharges into Smithtown Bay and Long Island Sound. It was estimated that the tidal flow amounts to about 1,000 cubic feet per second during the incoming and outgoing tides. A part of Smithtown Bay is used for growing of oysters.

Description of sewage disposal works

The sewage disposal works consist of two screen chambers, 2 Imhoff tanks, a dosing tank, a sprinkling filter, a final settling tank and a sludge bed.

Site.— The sewage disposal plant is located in the eastern portion of the property of the hospital and is adjacent to a branch of the Nissequogue river. There are no houses near the disposal plant, the nearest buildings being the cottages in the eastern group which are 1,200 feet from the plant.

Screen chambers.— There are two screen chambers, one being on the main sewer from the main portion of the hospital and the other being on the sewer line from the easterly group of houses. The main screen house is about 16 by 21 feet in plan and contains two sets of bar screens, each set having two screens of different size openings. The screens are all 3 feet 6 inches wide and are set at an angle of 30 degrees from the vertical, in the direction of flow of sewage. The screens consist of ¼ by 2-inch bar spaced to give 1½ inch openings between bars in the first screens and three-quarter-inch openings between bars in the second screens. The screens are cleaned twice a day by hand raking and the screenings are carried to the dump near the disposal plant. From the main screen house to near the disposal plant the sewer consists of two 8-inch inverted siphons and one siphon to each set of screens. This permits closing one set of screens and a siphon for cleaning or repairs. The screens on the line from the easterly group of buildings are located a short distance north of the disposal plant and are entirely under the ground surface. This screen chamber which is much smaller than the main screen chamber is similar in design and the screenings are also removed twice a day to the dump near the disposal plant.

Settling tanks.— The two settling tanks are of the Imhoff type, 26 feet square and about 23 feet deep. These tanks are constructed of mass concrete with the exception of the partitions separating the settling and digestion compartment which are of re-enforced concrete. Each tank has a center and two side settling compartments, and one sludge digestion chamber with two gas vents. A sludge removal pipe extends to the bottom of each digestion chamber and permits the removal of the sludge to the sludge drying bed. The settling compartments of both tanks have a capacity of about 37,000 gallons which gives a theoretical detention period of about 1.3 hours with the amount of sewage flowing as found at the time of the inspection. The available capacity of both sludge digestion chambers is about 3,360 cubic feet or about two-thirds cubic feet per capita. The Imhoff tanks are placed side by side and the raw sewage enters each tank from troughs at the outer ends of the tanks. The effluent is discharged through a central trough located between the tanks. Scum boards are placed about one foot in front of the influent and effluent troughs to prevent a direct flow across the tank on the surface and to prevent scum from passing out with the effluent.

Dosing chamber.— The dosing tank is located northeast of the settling tank, is hopper shaped and has a capacity of about 2,115 gallons. This tank contains a 12-inch automatic siphon which discharges the settled effluent intermittently to the sprinkling filters. At the time of the inspection the tank filled in a little over 5 minutes and was emptied in an average of about 4½ minutes thus making a complete cycle in about 10 minutes.

Sprinkling filters.— The sprinkling filter is 85 feet by 124 feet in plan and contains about 6½ feet of broken stone from ¾ to 2 inches in size. The sewage is sprinkled through square Taylor nozzles which are placed 13 feet center to center in 9 rows of 6 nozzles in a row. Each row of nozzles has a gate valve which permits the shutting off of any row as desired. The total area of the filter is one-quarter of an acre and with the amount of sewage flowing as found during the inspection the filter was being operated at the rate of about 2,100,000 gallons per acre per day which is equivalent to about 323,000 gallons per acre per foot in depth per day. A portion of the surface of the filter is dug over every day and about once a year the upper two or three feet of the filter is dug over. Portions of the surface not recently dug over showed considerable sewage growths and algae of the cladophora type. The nozzles are cleaned each day by removing several of them and permitting the sewage to flush out through the open pipe ends. After cleaning the nozzles are replaced. This cleaning takes from one to two hours and permits considerable sewage to pass through the filter in considerable quantities without proper aeration and oxidation.

Secondary sedimentation.— There is a secondary sedimentation tank 13 feet by 25 feet in plan which contains three hopper shaped bottoms in order to facilitate the removal of the sludge. This tank has a total depth of 12 feet. The inlet consists of submerged 12-inch pipes in the west end of the tank and the settled effluent is discharged over an overflow weir into a trough at the east end of the tank. This secondary sedimentation tank has been abandoned and filled with earth and the sprinkling filter effluent is now discharged directly into the river without any final sedimentation.

Sludge disposal.— The sludge bed 38 feet by 64 feet is located southwest of the Imhoff tanks. This sludge bed is divided into two sections by a 1¼-inch plank partition. The bed consists of about 12 inches of sand and gravel graded from coarse material on the bottom to sand at the surface. There are four lines of 3-inch underdrains through each of the two sludge beds. Considerable trouble was caused by the stoppage of the sludge pipe in the Imhoff tanks when the sludge remained in the tanks too long and it is the present practice at this plant to drain practically all of the sludge from each tank once a month and discharge it upon the sludge bed. This procedure gives a sludge which is similar to the sludge produced in an ordinary settling tank and not like the normal well digested sludge of the Imhoff tank. This sludge has considerable odor as drawn from the tank. The sludge is dried upon beds and then removed to a dump nearby.

It is the intention of the hospital authorities to utilize this sludge for agricultural purposes if advisable and, therefore, this investigation was made partially on that account to determine the amount of bacteria found in the dried sludge.

The disposal plant is under the care of the chief engineer of the hospital. There is also a mechanic who has direct charge of the plant and he is assisted by one of the inmates.

Efficiency of the plant as determined by chemical analyses

In order to determine the efficiency of the plant to properly treat the sewage contributed to it and also as a test of the operating efficiency of the different units comprising the plant analyses were made of the sewage, of the different effluents and of the water of the stream into which the effluent was discharged. The report of these analyses which includes the temperature of the sample gives the results of the tests of turbidity, oxygen consumed, dissolved oxygen, nitrates, chlorine, putrescibility and bacteria and the results are shown in the following tables:

TABLE OF ANALYSES MADE ON OCTOBER 24 AND 25, 1916

	Temperature	PARTS PER MILLION							Putrescibility days
		Turbidity	Oxygen consumed, 10 min. boiling	DISSOLVED OXYGEN		Nitrates	Chlorine		
				Parts	Per cent of saturation				
Raw sewage	73	130	44	2.0	22	.1	22.5 27.5	25.0	½
Tank effluent	71	120	62	1.5	17	.1	25.0		1.2
Filter effluent	64	20	21	6.1	64	3.0 4.0	25.0		6

BACTERIOLOGICAL ANALYSES

	Total count	PRESENCE OF B. COLI GROUP			
		10 c.c.	1 c.c.	1/10 c.c.	1/100 c.c.
Water from bay, incoming tide before receiving effluent	20	3+0—	3+0—	0+3—	0+3—
Water from bay, incoming tide 500 feet inside of point of discharge of effluent	460	3+0—	3+0—	3+0—	3+0—
Sludge from Imhoff tank		1/100 c.c.	1/1,000 c.c.	1/10,000 c.c.	1/100,000 c.c.
Two weeks on sludge drying bed	640,000	3+0—	1+2—	0+3—	0+3—
Three weeks on sludge drying bed and three weeks on dump	1,400,000,000	.....	3+0—	3+0—	3+0—
Six months on dump	17,000,000	3+0—	.....	3+0—	0+3—
					1/1,000,000 c.c.
Two weeks on sludge drying bed	640,000	.....	.....	.....	0+3—
Three weeks on sludge drying bed and three weeks on dump	1,400,000,000	.....	.....	.....	3+0—
Six months on dump	17,000,000	.....	.....	.....	0+3—

While these analyses may not represent the average condition of the operation of the plant over a long time they do nevertheless, show clearly the efficiency of different units of the plant at the time of the inspection. The result of these analyses together with the efficiency of the different units may be stated as follows:

The raw sewage as received on the day of the inspection appeared to be from one-third to one-half as strong as the average domestic sewage of a small village as indicated by the oxygen consumed and the chlorine tests. This weak character of the sewage is undoubtedly partially due to the large amount of water used in the laundry and for washing purposes. The two parts of dissolved oxygen indicated that the sewage was in a fresh condition as received at the plant. This was also shown by the 1/10 part of nitrate present.

The tank effluent gave results somewhat higher in the oxygen consumed test over those found in the raw sewage and this was undoubtedly due to the fact that much of the solid matter in the raw sewage had become broken up in passing through the tank and to the fact that this sewage was probably somewhat stronger as received at the plant. A reduction of turbidity was

shown from 130 parts to 120 parts and the dissolved oxygen present was also reduced to one-half part in passing through the tank. In the putrescibility test the tank effluent stood up one-half day the same as the raw sewage. The nitrates were the same as found in the raw sewage.

The sprinkling effluent had 21 parts of oxygen consumed as compared with the 62 parts in the tank effluent and showed a reduction of about 60 per cent of organic matter. The dissolved oxygen had increased from 1.5 parts to 6.1 parts due to the aeration the sewage received. Two tests for nitrates gave 3 and 4 parts thus showing a fair degree of nitrification. In the putrescibility tests the sample stood up for 6 days which considering the amount of sewage being treated represents the attainment of a fair degree of stability. The turbidity had been reduced from 120 parts to 20 parts showing that the effluent was much clearer in appearance. There was, however, considerable suspended matter much of which could easily be removed by final sedimentation.

The samples for bacteriological analyses taken of the water from the bay on the incoming tide before passing the point of discharge of the effluent showed a total count of 20 bacteria per c.c. and organisms of the B. coli group present in the three 1 c.c. inoculations.

Samples of the same water taken 500 feet inside of the point of discharge of the effluent gave 460 bacteria per c.c. and showed organisms of the B. coli group in all of 3 1/100 c.c. inoculations. This showed that even with the high resultant dilutions the water was receiving some contamination due to the discharge of the effluent.

Samples of the dried and partially dried sludge were collected and sent to the Division of Laboratories and Research in order that the total counts of bacteria and the presence of organisms of the B. coli group might be determined and the results of these tests are shown as follows:

1. That the sludge which had been on the sludge drying bed for 2 weeks contained about 640,000 bacteria per gram of dry sludge and that organisms of the B. coli type were present in 3 of the 1/100 gram samples and in one of the 1/1000 gram samples.
2. Sludge which had been drying on the sludge bed for 3 weeks and 3 weeks on the dump gave a total count of 1,400,000,000 per gram and showed organisms of the B. coli group in all of the 3 1/1,000,000 gram samples.
3. Sewage which had been dried on the sludge bed for a few weeks and had then remained on the dump for about 6 months gave a total count of 17,000,000 bacteria per gram and also showed the presence of organisms of the B. coli group in all 3 of the 10,000 gram samples.

Summary and conclusions

As a result of the investigation of this plant and after a careful consideration of the condition of operation and the results of the analyses of the effluent from the various parts of the plant, the following summary and conclusions are drawn:

1. That the present method of cleaning the nozzles permits considerable sewage to pass in concentrated volumes through the filter without receiving sufficient aeration and nitrification.
2. That the abandonment and filling of the final settling tank prevents the removal of considerable suspended matter from the sprinkling filter effluent.
3. That the present method of removal of the sludge gives a sludge similar to that of an ordinary settling tank and it is not well digested and has considerable odor.
4. The sludge is apparently not safe to use for agricultural purposes where the crops are for human consumption as shown by the bacteriological analyses.
5. That the river water as seen by the bacteriological analyses was receiving considerable pollution due to the discharge of the effluent.

Recommendations

In view of the results of this investigation I would recommend that the hospital authorities be requested to make the following changes in the operation and construction of the disposal plant in order that the plant may be operated at all times in a satisfactory manner:

1. That when it is desired to clean any of the nozzles the valve to any nozzle line be closed and the nozzles removed and cleaned, and if necessary sewage may be allowed to flow through the open ends for a few seconds in order that any material which might clog the nozzles may pass out of the pipes but under no circumstances should the nozzles be left off for several minutes with the sewage passing freely through the open ends and thence down through the filter without proper aeration and oxidation.
2. That the sludge removed from the sludge drying bed be placed in a suitable dump and that such dump should not be located below high water on account of the danger of polluting the river. If it is desired to use the sludge for agricultural purposes it should be placed on land where no crops for human consumption would be grown for 2 or 3 years.
3. That the final settling tank be cleaned out and placed in use and operated efficiently and that if necessary another sludge bed be constructed below the final settling tank for the drying of sludge from this tank.

That the final effluent from the disposal plant be sterilized with liquid chlorine or other suitable disinfectant in order to prevent contamination of waters of Smithtown Bay and its tributaries.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *January* 15, 1917

Plans showing changes in the sewage disposal works at the Kings Park State Hospital embodying the changes recommended above were later prepared by the State Architect and approved by this Department (see page 81 of this report.)

MONTICELLO

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an inspection of the sewage disposal plant for the village of Monticello, Sullivan county, made by Mr. C. A. Holmquist, assistant engineer in this Department, on November 24, 1917.

The village of Monticello which is located near the central part of Sullivan county on the New York, Ontario and Western railroad, has a population, according to the 1915 State census, of about 2,000. This population is increased during the summer by summer visitors to about 4,000. The water supply of the village is obtained from Kiamesha lake and according to a statement of the village clerk from 250,000 to 300,000 gallons of water are pumped per day during the winter.

Plans for a comprehensive sanitary sewer system and for a sewage disposal plant consisting of a three-compartment settling tank, four contact beds and two intermittent sand filters having an area of one acre each and a sludge drying bed were approved on January 20, 1911. The sewerage and sewage disposal systems were constructed in 1911. On August 22 and 23, 1913, the disposal plant was inspected by a representative of this Department. Reference is made to my reports on the examination of the plans, dated October 24, 1910, and January 14, 1911, and to the report on the inspection dated August 28, 1913, for a detailed description of the construction and operation of the sewage disposal plant.

The previous inspection of the disposal plant referred to showed that, although the sewerage and sewage disposal systems had been constructed in general accordance with the approved plans the disposal plant had not been properly operated and maintained. The report on the inspection, a copy of which was sent to the village authorities, contained the following recommendations which the village was urged to carry out:

1. At least one man who would give all his time to the work should be employed to operate and maintain the plant. Such man could also supervise the operation and maintenance of the settling tank at the tannery.
2. The septic tank should be cleaned out as often as once a year.
3. All four of the contact beds should be operated at least in the summer.
4. The sand filters should be reconstructed, thoroughly cleared of grass and weeds, and the surface of the bed now in use scraped.
5. The reconstruction of the sand filters and the relaying of the underdrains should be done under the direction of a competent sanitary engineer.
6. After the sand filters are reconstructed both beds should be used alternately and the beds scraped as soon as surface clogging takes place. The sand removed by scraping should be replaced with new, clean sand from time to time, so as to maintain a proper depth of filtering material.

The recent inspection showed that the above recommendations have partially been carried out and the changes made, and conditions found will be taken up separately in the order given above.

Operator

A man has been employed by the village to give all of his time during the summer and part of his time during the winter to the operation of the disposal plant. Although the man employed appeared to understand the construction and operation of the plant, it is not a satisfactory arrangement to have a man give only part of his time to the operation of the plant during the winter because, although the flow of sewage is greater in the summer than in the winter, due to the influx of summer visitors to the village, a disposal plant of this type will require more attention in the winter than in the summer to maintain it in proper operating condition and to prevent the sand filters from freezing.

Settling tank

Two compartments of the settling tank had been cleaned out thoroughly a short time before the last inspection. This, it was learned, was the first thorough cleaning that the tank had received since it was constructed in 1911. The third compartment of the tank had not been cleaned, and it would be well to allow this compartment to stand full until next spring before emptying it in order to give the sludge an opportunity to become thoroughly digested before the tank is emptied and since, if emptied during the winter, the sludge would freeze and would not dry until next spring. Two compartments of the settling tank should be adequate to care for the winter population.

It was learned that a large amount of grit was found in the two compartments of the settling tank recently cleaned. This grit had probably reached the sewers tributary to the disposal plant through openings in manhole covers of the sewer system, many of which it was learned are now below the level of the street surface due to regrading and resurfacing of the street. Some of the low manholes have been raised and the remainder of the manholes should be raised as fast as practicable, in order not only to prevent the clogging of the sewers, but also for the purpose of keeping the grit out of the settling tanks.

The flow at the time of the inspection, measured from a weir at the outlet of the dosing chamber at the settling tank, and computed from the time it required to fill two of the contact beds, was about 400,000 gallons per day, equal to a per capita rate of sewage contribution of 400 gallons per day, there being about 1,000 persons connected with the sewer system during the winter. The high flow recorded is, in all probability, due to leaky sewers, inasmuch as only about one-half of the population of the village is served by sewers and since the water consumption for the entire village is only from 250,000 to 300,000 gallons per day.

Contact beds

It was learned that all four of the contact beds have been maintained in operation as recommended in the previous report. The beds did not appear to be clogged and the effluent was clear and nearly colorless at the time of the inspection. The rate of operation of the contact beds which are 4½ feet deep and have a combined area of .3 acre, would be about 330,000 gallons per acre per day during the winter, based upon a per capita rate of sewage contribution of 100 gallons. Based upon the actual flow of 400,000 gallons per day found to exist at the time of the recent inspection, the rate of operation was approximately 1,300,000 gallons per acre per day. The rate during the summer is correspondingly greater.

Sand filters

The sand filters were reconstructed during the summer of 1915 at a cost of about $4,000. It was learned that all of the old sand had been removed, the underdrains reconstructed and new sand placed on the beds. The new sand, however, had not been screened and contained some gravel larger than one-eighth inch in diameter. Samples of the sand were collected at various depths of each of the two sand filters and found to have the following effective sizes: .15 mm.; .25 mm.; .33 mm.; .35 mm. The uniformity coefficient of the samples collected varied from 2.6 to 5.

The sand, however, was fairly clean except some 6 inches of the top layer, which was black and dirty, due to the harrowing of the beds after cleaning. The beds should be thoroughly scraped but not harrowed or the sludge and organic matter will be worked into the beds and consequently clog them, which will finally require the removal and replacing of the top layer of sand.

The surface of the sand in the filters was not level, but considerably higher in the middle of each bed and on the westerly side. In one of the beds about two-thirds of the area and in the other bed about one-half the area was too high to be flooded at each dose of the contact bed, so that less than one-half the area of the filters was not in effective operation and the net rate of operation was excessive, being more than two times the rate for which filters had been designed to operate.

The high portions of the beds were overgrown with grass, and the shallow portions were beginning to clog badly, although all filters had been cleaned a relatively short time before the time of the last inspection. The operator stated that in spite of the unsatisfactory condition of the filter beds they had operated satisfactorily since they were reconstructed in 1915 until the heavy rains which occurred for two days before the time of the inspection. The rain had increased the flow to such an extent as to seriously overtax the filters, and it was estimated that about 10 per cent of the effluent from the contact beds did not pass through the filters, but flowed out through an overflow of the second bed into the effluent channel. The overflow, however, was clear and colorless.

The sand filters, however, will not continue to operate properly unless they are thorougly cleaned and the surface of the beds are made as level as possible, so that the entire area of the filters will be effective and so prevent overtaxing any portions of the beds. The filters should also be furrowed during the winter to prevent freezing.

A greater flexibility of operation would also be obtained if each bed were divided into two equal sections by means of embankments. If this were done it would be necessary to throw only one-fourth of the total area of the sand filters out of use during cleaning, whereas now one-half of the area is thrown out each time that the bed is cleaned. The embankments should be constructed of heavy impervious material containing a large percentage of clay to prevent leakage through the embankments from one section to the other and the sides of the embankments should be sodded so that the material composing the embankments will not work down into the sand filters. It would be relatively inexpensive to construct such embankments and it would facilitate cleaning the beds and would thereby increase the efficiency of the filters.

If the beds are leveled, subdivided and scraped at regular intervals the filters should satisfactorily care for the sewage of the village. If, however, after these changes have been made the beds are still found to be overtaxed owing to the excessive flow, due to the infiltration of ground water into the sewer system through leaky joints in the sewer, it might be necessary to install additional lines of underdrains between the existing underdrains which are now spaced 30 feet apart. It should, however, not be necessary to install an additional filter until the population tributary to the disposal plant is considerably increased.

The rate of operation of the filters during the winter would be about 50,000 gallons per acre per day, based upon a rate of sewage contribution of 100 gallons per day and about 200,000 gallons per acre per day, based upon the measured flow of sewage. The rate of operation during the summer when the population tributary to the disposal plant is probably doubled would be twice the above rate and during this period the filters would necessarily require careful operation and maintenance to keep them in satisfactory condition. It is evident, therefore, that steps should be taken by the village to discover where the leaky sewers exist and repair such sewers, in order to reduce as far as possible the present excessive infiltration of ground water into the sewers. An inspection should also be made of all house connections, in order to determine if any rain water leaders are connected to the sanitary sewers.

The effluent from the disposal plant was clear and colorless at the time of the inspection and there was no visual evidence of pollution from the discharge of effluent into the stream below the plant. It was learned, however, that the disposal plant does not always remove all of the color from the sewage, due to the discharge of wastes from the tannery of John Campbell & Co., which wastes are high in color.

Tannery disposal plant

The settling tank at the tannery of John Campbell & Co. was also inspected at the time of the recent investigation. It was found that, although the recommendations in our previous report with reference to the regular cleaning of the tank and the exclusion of the buffings from the part of the building in which the settling tank is located had been complied with, the tank had not been so remodeled as to permit of shutting off both the inlet and outlet of either of the two compartments of the tank during cleaning.

This should be done by reconstructing the inlets and the partition wall between the two compartments of the tank. It might be found necessary to brace the central partition, which is of wood, to prevent it from collapsing when one side of the tank is emptied for the purpose of cleaning. In cleaning the tank the supernatant liquid should be bailed or pumped out without stirring the tank any more than possible, after which the sludge or solid should be bailed out and disposed of. It might be possible to so reconstruct the outlets as to permit of drawing off the supernatant liquid and discharging it into the sewer by gravity flow when the tank is cleaned.

There were from 12 to 18 inches of sludge in the tank at the time of the inspection. The tank should not be allowed to fill to a greater depth than

this before it is cleaned. It is important to the successful operation of the village sewage disposal plant that the settling tank of the tannery should be operated as efficiently as possible in order to prevent as far as practicable the solids from the tannery sewage, which consist of relatively stable material, from reaching the sewage disposal plant. The efficiency of the settling tank could be increased considerably by installing a baffle board across the inlet end of the tank. This baffle should be about 12 inches from the inlet end of the tank and should extend from a few inches above to some 12 inches below the flow line.

The supernatant liquid from the leaching or sumac tanks should be drawn off and discharged into the tannery sewer and the inert sumac or solids in the sumac tanks should be removed from the tank and disposed of as sludge instead of discharging the entire contents of these tanks into the settling tank of the plant.

Conclusions and recommendations

In conclusion, I would state that it was found from the recent investigation that although the recommendations of our previous report had in general been carried out, certain changes and modifications, principally in the operation and maintenance, should be made in the plant in order to increase its efficiency, as follows:

1. One man should be employed to give his entire time to the operation of the plant all the year round.
2. The middle compartment of the settling tank should be cleaned next spring and all of the compartments of the tank should be cleaned at least once each year.
3. The filter beds should be scraped thoroughly.
4. The filter beds should be so regraded as to make them as nearly level as possible.
5. The filter beds should be furrowed during the winter.
6. Each filter bed should be divided into two sections as soon as weather will permit of doing this work next spring.
7. The sand filters should be dosed alternately and the beds should be scraped as soon as surface clogging takes place. The sand removed by scraping should be replaced by new, clean sand from time to time.
8. All manholes should be so raised that the level of the manhole cover is not below the level of the surface of the streets.
9. Steps should be taken to discover leaky sewers and have such sewers repaired as soon as possible to prevent excessive infiltration of ground water.
10. The settling tank at the tannery should be so reconstructed as to permit of shutting off the flow through the tank during cleaning.
11. The solids in the sumac tanks should be removed and not discharged into the tannery sewer and disposal plant.
12. The operation and maintenance of the tannery settling tank should be under the supervision of the village authorities.
13. The sludge in the tannery settling tank should not be allowed to accumulate to a depth of more than 18 inches before it is removed.

I would recommend also that copies of this report be sent to the village authorities and to John Campbell & Co. with the request that steps be taken to carry out the recommendations embodied in this report.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 15, 1917

A copy of this report was transmitted to the village authorities on December 17, 1917, and they were urged to take the steps necessary to carry out the recommendations of the report.

MT. KISCO

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report upon the sewage disposal plant of the village of Mt. Kisco. An inspection of this plant was made on December 29, 1916, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Mr. J. P. Carver, assistant engineer of the department of water supply, gas and electricity.

This disposal plant was constructed by the city of New York for the protection of the water of Croton lake from pollution at this point, and it is maintained by the city under the direction of the department of water supply, gas and electricity. The sewer system was constructed and is maintained by the village.

Location.— About 1 mile south of the village.

Population.— Estimated population 3,000, of which nearly all are served by the sewer system and sewage disposal plant.

Water supply.— Byram lake and small brook about 4 or 5 miles southeast of the village. Consumption estimated to be about 90,000 gallons per day.

Sewer system.—About 7 miles of sanitary sewers varying from 6 to 24 inches in diameter.

Sewage flow.— Average daily flow of 400,000 gallons estimated at the time of inspection. Amount said to vary from 200,000 to 600,000 gallons per day, depending upon the height of the ground water.

Disposition of effluent.— Discharged into Kisco creek. Watershed above disposal plant about 6½ square miles. Flow during inspection estimated at 1.3 cubic feet per second or .2 cubic foot per second per square mile.

Condition of stream.— Upon Kisco creek about 1½ miles below the disposal plant the city of New York has established a sterilization plant to sterilize the waters of the creek on account of the creek above this point receiving the effluent from the sewage disposal plant and the surface wash from the village of Mt. Kisco. At the time of the inspection this sterilization plant consisted of a mixing and storage tank and regulation devices to apply chlorine obtained from the solution of hypochlorite of lime and water. The amount of chlorine applied varied from 1 to 2 parts per million depending upon the amount of water flowing in the creek, the low flow receiving the smaller amount, while the high flow, containing considerable surface run-off, received the larger amount. At the time of the inspection changes were being made to apply liquid chlorine and 5 sets of apparatus were to be installed, 4 of them capable of applying from 50 to 325 pounds per day and the other one from 25 to 125 pounds per day.

Disposal plant.— The disposal plant consists of pump well, screen and pump station, settling tanks, alternating and time siphons, 3 primary and 3 secondary contact beds, a sterilization plant and sludge trenches. The plant was completed and placed in operation February 1, 1913.

Pump station.— The pump station is 20 feet square and is constructed of brick with a frame and tile roof. The pump well is 8 feet by 20 feet in plan and has an ordinary fluctuation of water level of 5½ feet. There are two sets of inclined screens, one with bars 1½ inches in the clear and the other with bars ⅝ inch in the clear. The pumping plant consists of 2 centrifugal pumps each having a capacity of about 350 gallons per minute and each operated by a 10-horsepower Westinghouse electric motor. There is also a 450 gallons per minute centrifugal pump operated by a 20-horsepower gasoline engine. The head pumped against is about 45 feet, which is the combined head, due to the difference in levels and the friction in 3,700 feet of 10-inch castiron force main.

Settling tank.— There are 3 settling tanks 21 feet by 53 feet in plan. Each tank has a center partition extending from one end to within a few feet of the other end. This makes the tank practically about 10 feet wide and 100 feet long. Each tank has a capacity of about 85,000 gallons, which gives

a theoretical detention period of about 5.1 hours with the amount of sewage as found during the inspection. Only 1 or 2 tanks are used at a time and the other tank or tanks are allowed to remain full to permit part of the sludge to digest under septic action. The tanks are occasionally cleaned, the sludge pipe discharging it into sludge trenches.

Primary contact beds.— The three contact beds are each 64 feet by 74 feet in plan and have an average depth of about 4¾ feet. This makes a total area of about one-third acre. The sides and bottom of the beds are of concrete and contain about 4½ feet of broken stone varying from ¾ of an inch to 2 inches in size. The entire bottoms of the beds are covered with underdrains which are half round 6-inch tile laid with open joints, draining towards the main drain in the center of each bed. The tank effluent is delivered to each bed at the bottom. Considering the voids in the beds to be about one-third of the volume of stone, the beds may be said to have a capacity of about 55,000 gallons each. An Ansonia regulator or dosing device controls the flow of tank effluent to each bed, the contact period and the discharge to the secondary beds. The number of fillings would vary from 4 to 9, depending upon the amount of sewage, and at the time of the inspection there were about 7 fillings per day. The regulator operates so that one bed is held full of sewage while the next bed is being filled and the third bed is being emptied and aerated. The time of filling, the contact period and aeration period will depend upon the amount of sewage flowing and will vary from 3 to 6 hours. At the time of the inspection the rate of treatment on the primary beds was about 1,200,000 gallons per acre per day or 267,000 gallons per acre per foot in depth per day.

Secondary contact beds.— These beds are similar in number and design to the primary beds, there being one bed to each of the primary beds, and an Ansonia regulator controls the filling, contact period and emptying of each bed. The effluent is discharged into the secondary settling tanks.

Secondary settling tanks.— There are two tanks each 30 feet by 72 feet in plan and 3½ feet deep. Each has a capacity of about 64,000 gallons, and with both tanks in use the theoretical detention period is about 6 hours.

Sand filters.—There are three sand filters, each 66 feet by 117 feet in plan, and they have a total area of about .63 of an acre. Each bed contains about 3 feet of sand having an effective size of .35 mm. The sewage is distributed on each bed at an opening in the center of the southeast side. Underdrains consist of 4-inch open jointed tile pipe surrounded with gravel. The lines of these pipes are spaced 10 feet center to center. At the time of the inspection the rates of treatment amounted to 800,000 gallons per acre per day. It is the custom to use one bed for 24 hours and then divert the flow to another bed for 24 hours. At the time of the inspection the bed in use had about 1½ feet of sewage standing on it. On one of the beds several small hills of sand had been thrown up about 10 feet apart apparently to support ice forming on the filters. These hills were, however, so far apart that they were of no practical value and about 1 inch of ice had formed on the surface of the sand.

It is proposed to build two more filters in the spring which will give a total area of about five-sixths acre and the rates of treatment will then be reduced to 480,000 gallons per acre per day with the amount of sewage flowing as found during the inspection.

Sludge disposal.— Sludge trenches 80 feet long, 6 feet wide and 8 feet deep were constructed of timber at the time of the construction of the works. Due to decaying of the timber these trenches are caving in and are almost full of sludge. Much of the sludge discharging into these trenches overflows to an open sludge bed 50 by 100 feet and from this bed the partially clarified portion flows through an opening, where it is treated with a solution of hypochlorite of lime, to the creek. This sludge bed is not underdrained and ground water stands close to the surface.

Disinfection.— The effluent from sand filters and from sludge bed is treated with a solution of hypochlorite of lime. The disinfection plant consists of mixing and storage tanks and uniform flow orifices. About 100 pounds of

hypochlorite of lime are used each day and this corresponds to about 11 parts of available chlorine per million gallons of sewage with a daily flow of about 400,000 gallons.

The appended table taken from paper by Mr. T. DeL. Coffin and Mr. F. E. Hale, read before American Water Works Assocation, shows the averages of analyses of raw sewage and the various effluents for 1915.

Summary and conclusions

1. That the present method of controlling the flow of sewage to and from contact beds gives too long a contact period and too short an aeration period. This is also shown by the reduction rather than increase in the amount of nitrates present in the effluent from the primary and secondary contact beds from that found in the tank effluent.
2. That the three sand filters are greatly overtaxed, but with the addition of the two new sand filters which it is proposed to construct this year they should produce a much more satisfactory effluent. This overtaxed condition is shown by the small amount of nitrates present and by the high bacterial counts.
3. That the present method of dosing the beds over long periods rather than by more frequent intermittent doses on all beds during the 24 hours and the absence of suitable automatic dosing device results in excessive flooding of the bed in use with the resulting loss of proper aeration and nitrification in the beds.
4. That the small mounds on the surface of the sand filters were too far apart to give satisfactory support to ice forming on the filter and at the time of the inspection the surface of the sand in the bed which contained the mounds was covered with about 1 inch of ice.
5. That the present method of sludge disposal is unsatisfactory since the bed is not underdrained and partially clarified liquid (high in organic matter) from the sludge passes through the opening to the creek. This partially clarified liquid is treated with hypochlorite of lime.

Recommendations

1. That filling and emptying regulators of contact beds be adjusted so that contact bed will remain full only about 1½ hours, thus providing a longer period of aeration and reducing the likelihood of septic conditions within the beds.
2. That the two proposed sand filters be constructed as soon as possible and that a suitable dosing apparatus be provided for dosing each bed in turn with sufficient sewage to flood the bed to a depth of not more than 2 inches and that during the winter months the surface of the sand filters be ridged and furrowed in order that ice forming on the beds may be properly supported.
3. That a suitably underdrained sludge bed be provided to receive the sludge from the sludge trenches or from settling tanks. Effluent from the sludge bed should be sterilized as at present or, better still, it should be pumped to the secondary settling tank to pass through the sand filters.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *June* 5, 1917

A copy of the above report was later transmitted to the department of water supply, gas and electricity of New York and advices were thereafter received that bids were to be received for enlargement of the sand filter area.

AVERAGES OF ANALYSES OF SEWAGE AND VARIOUS EFFLUENTS OF MT. KISCO SEWAGE DISPOSAL PLANT FOR THE YEAR 1915

SAMPLE	PHYSICAL EXAMINATION		CHEMICAL ANALYSIS (PARTS PER MILLION)														BACTERIOLOGICAL EXAMINATION								
			NITROGEN AS														B. COLI								
			Kjeldahl ammonia																						
Place of collection	Turbidity (parts per million of silica)	Color (parts per million of platinum)	In solution	In suspension	Total	Free ammonia	Nitrites	Nitrates	Total solids	Suspended solids	Loss on ignition	Fixed solids	Chlorine	Putrescibility (oxygen demand)	Free carbonic acid	Number of bacteria per c.c. 24 hours at 37.5° C.	.000001 c.c.	.00001 c.c.	.0001 c.c.	.001 c.c.	.01 c.c.	0.1 c.c.	1 c.c.	10 c.c.
																	%	%	%	%	%	%	%	%
Raw sewage (P. S.)	239	.....	14.1	10.5	24.6	23.9	0.125	0.52	575	231	276	299	49	153	40.8	1,480,000	37	84	98	100	100	100	100	100
Septic tank effluent	81	.....	3.9	3.0	6.9	12.2	0.058	0.31	307	44	104	203	41	90	45.0	400,000	22	49	92	100	100	100	100	100
First contact bed effluent	83	.....	4.3	3.2	7.5	12.6	0.062	0.31	323	45	106	217	45	81	44.5	560,000	20	59	92	100	100	100	100	100
Second contact bed effluent	63	.....	3.6	2.8	6.4	10.9	0.111	0.29	288	26	77	211	45	45	48.6	470,000	16	59	92	100	100	100	100	100
Settling basin effluent	53	.....	2.8	2.3	5.1	9.5	0.072	0.15	279	21	69	210	46	27	48.5	460,000	14	49	90	100	100	100	100	100
Sand filter effluent	10	27	.....	.....	0.419	3.74	0.033	2.74	299	....	64	235	46	....	66.7	38,000	....	10	60	83	100	100	100	100
Filter effluent chlorinated	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	....	38	....	....	....	....	....	4	8	39

NEWARK

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on the operation of the sewage disposal works at the village of Newark, Wayne county, made at your direction and as the result of a request from the health officer of the village.

According to the communication received from the health officer, the village authorities feared that the discharge of wastes from certain chemical works in the village into the sewer system might have a deleterious effect on the village sewage disposal works, and desired to have analyses made of the sewage and sewage effluent. The inspection was made by Mr. C. A. Holmquist, assistant engineer in this Department, in company with Dr. Augustus A. Young, health officer of the village, and Mr. Stanley Scarth, superintendent of the water and sewers of the village.

A detailed inspection of the sewage disposal works, which consist of a screen and grit chamber, primary settling tank of the Imhoff type, pumping station, sprinkling filter and final settling tank, was made by a representative of the Department on September 13, 1914. The results of this inspection were set forth in a report dated November 27, 1914, a summary of which is printed on page 495 of the 35th Annual Report.

This report contains a general description of the village, its location, a description of the sewer system and a detailed description of the construction and operation of the disposal works, and this data will not therefore be reviewed at this time. The following conclusions and recommendations were made in the report referred to:

Conclusions

1. The screen and grit chamber are operating properly but do not have much effect on the sewage since only sanitary sewage is received at the plant.

2. The Imhoff tank is operating effectively with the weak sewage contributed to it although the scum on the digestion chamber could be removed to advantage.

3. The pumping station is kept in good condition but in the operation there are two features of construction and operation provided for by the plans which are not being adhered to. This departure from the plans results in:

(a) Intermittent pumping to the dosing tank, giving very poor distribution to the filters.

(b) Allowing the sewage to overflow and by-pass the filters while sludge is being pumped to the sludge bed.

4. The capacity of the siphon on the dosing tank is about reached under conditions of steady flow and under the condition of intermittent flow the siphon will not break, which causes the greater part of the sewage to be applied to the filters under a small head.

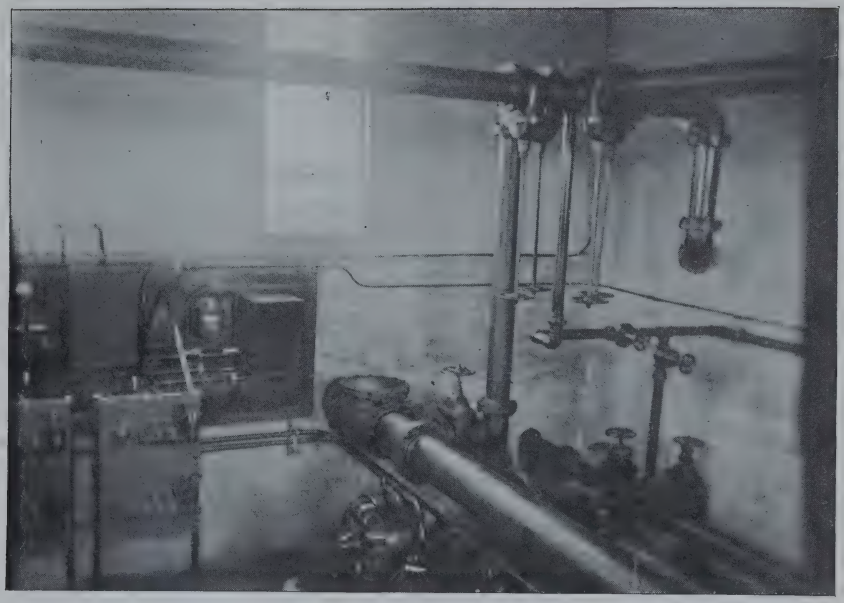
5. The sprinkling filters are in good condition and give a fair effluent even under the poor conditions of distribution.

6. With the exception of the putrefying sludge in the bottom of the tank the final settling chamber was being properly operated.

7. The discharge of the effluent into a stream from which water is taken for drinking purposes is decidedly dangerous and the sterilization plant should be installed as provided for by the plans.

Recommendations

1. That the sterilization plant be installed to sterilize the effluent from the sprinkling filter and that a pipe be carried to the overflow opening to be used in case the pumping plant breaks down.



Interior View of Pumping Station of Sewage Disposal Plant at Newark

General View of Sewage Disposal Plant and Sewage Pumping Station at Newark

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2. That proper operation of the pumping station be maintained in order that no untreated sewage be discharged into the brook even at times of pumping sludge.

3. That the uneven distribution of settling tank effluent over the sprinkling filter be corrected by making the necessary changes in the operating apparatus so that the siphon will break during the operation of the pump. It might be possible to secure this result by one of the following methods, although sufficient study should be made to determine an efficient method to secure the result desired.

(a) Raising the lower bend in the Harding vent until the siphon will break.

(b) Raising the bell and and rearranging the piping to suit conditions.

(c) Placing resistance on electric current so that motor will operate at a lower speed.

(d) Installing a larger siphon.

4. That the final settling tanks be so operated that sludge from final settling tank is removed whenever gas is seen rising to surface.

At the time of the recent inspection the disposal works were carefully examined and samples of the raw sewage and effluent from different parts of the works were collected. It was found from this inspection that none of the recommendations quoted above have been fully complied with.

The primary settling tank had been cleaned about three weeks before the inspection and appeared to be operating satisfactorily. The flow according to weir measurements was about 500,000 gallons per day.

The pumping of the sewage was intermittent and the flow appeared to be too high to allow the siphon to break during the operation of the pumps. The result was that the spray from the nozzles did not cover the entire surface of the filter and did not provide a good distribution of the sewage. As pointed out in the previous report changes should be made in the pumping equipment or in the dosing apparatus in order to give a better distribution of the settled sewage over the surface of the sprinkling filter.

The final settling tank had not been cleaned since last April. It was nearly filled with sludge, and solids in suspension were being carried over the outlet weir into the effluent pipe to the stream. The accumulation of scum and the ebulition of gases in the tank indicated that septic action was taking place. The sludge should be removed whenever gas is seen rising to the surface or before sufficient sludge has accumulated in the tank to materially reduce its settling capacity.

The sludge was pumped from the final settling tank at the time of the inspection. The sludge removed was black in color, was nearly odorless and appeared to be well digested. The fuse at the pumping station blew out during the pumping of the sludge due, in all probability, to the heavy load thrown upon the pumping equipment in pumping both sludge and sewage at the same time. The result was that settled sewage temporarily overflowed from the pumping station into Military brook until the pumps were put in operation.

Military brook into which the effluent is discharged is a very small stream which empties into Ganargua creek about 1 mile below the village disposal works. The section through which it flows below the works is a sparsely settled agricultural district. The stream has a drainage area above the works of about 5 square miles, but the greater portion of the flow was recently intercepted by the construction of the Barge canal, so that practically all of the flow in the stream below the works consists of effluent from the disposal works.

The bottom of the stream below the works was covered to a depth of from a few inches to nearly 2 feet with sludge at the time of the inspection which gave rise to objectionable conditions. Although no public water supply is taken from Military brook or Ganargua creek below the disposal works the stream is very small so that unless the disposal works are properly operated a serious nuisance will be created in the stream. If the conditions in Military

brook above described are not improved by more efficient operation of the disposal works it might be necessary for the village to provide for more complete treatment of the sewage or for an extension of the effluent pipe to Ganargua creek.

Samples of the sewage were collected from the sewers below the factory of C. H. Stewart & Co., and below the chemical works of the Commonwealth Chemical Co., at the inlet to the disposal works, of the effluent from the Imhoff tank and from the final settling tank and sent to the Division of Laboratories and Research for analyses. The results of these analyses are appended to this report.

The results of one set of analysis cannot, of course, present the average condition of the sewage or sewage effluent. They do, however, show the condition at the time of the inspection. In order to determine the average condition of the works and as to what effect, if any, the discharge of industrial wastes into the sewer system of the village has on the operation of the disposal works, it would be necessary to make analyses of composite samples collected at hourly or half hourly intervals for a period of a week or more. This Department has neither the funds nor facilities for carrying on work of this kind. It would be well, however, for the village to employ a competent expert to carry on this work if it is found that the sewage disposal works do not continue to give satisfactory results.

The results of the analyses of the sewage collected from the sewer in Van Buren street at the intersection of East avenue show a bacterial count of 13,250,000 per cubic centimeter which is high for ordinary raw sewage and does not indicate that any wastes having a germicidal effect on the sewage was being discharged into the sewer at the time the sample was collected. This sewer has two houses connected with it in addition to the factory of C. H. Stewart & Co., at which factory certain chemicals are manufactured.

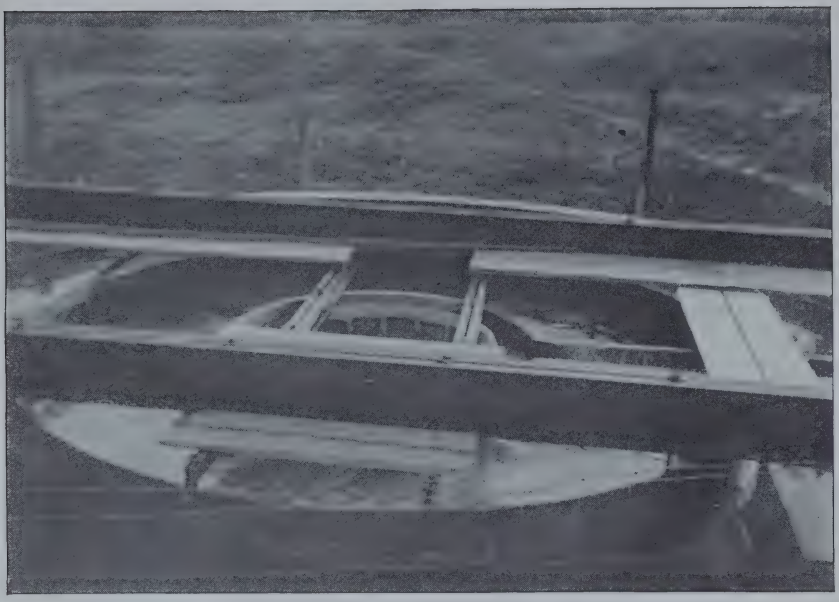
The sample of sewage collected from the sewer in Hoffman street below the plant of the Commonwealth Chemical Co. contained 200,000 bacteria per cubic centimeter. This is low for sewage of average strength and would indicate that the wastes discharged into the sewage from the Commonwealth Chemical Co. had a germicidal effect on the sewage without, however, completely sterilizing it. It is possible, however, that the sewage was very dilute. There are 4 houses connected with the sewer in Hoffman street in addition to the plant of the Commonwealth Chemical Co. above the point where the sample of sewage was collected.

The result of the analyses of the sewage collected at the inlet to the disposal works was weaker than the averge sewage as indicated by tests for chlorine and oxygen consumed. The bacterial count of 2,750,000 per cubic centimeter is somewhat higher than could be expected from a weak sewage and would indicate that the trades wastes discharged into the system at the time of the inspection, did not have any sterilizing effect on the sewage of the entire village at the disposal works.

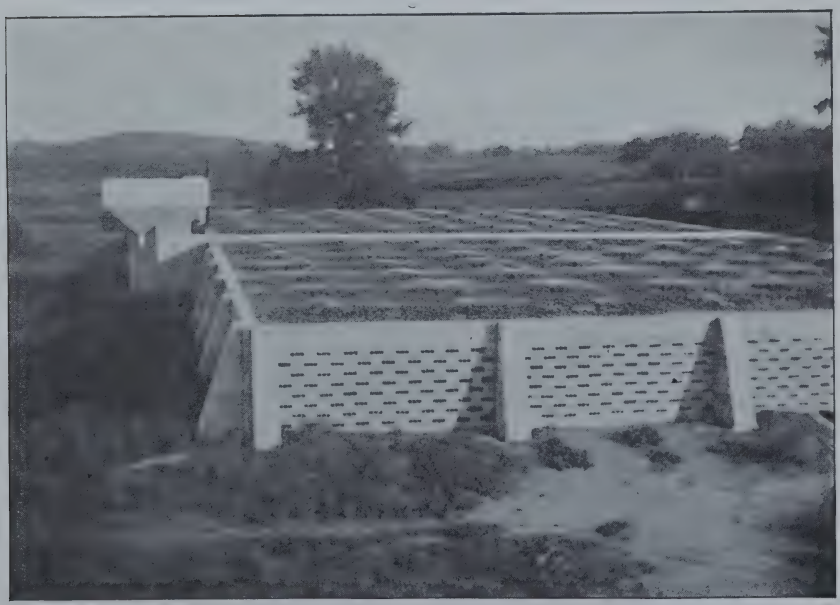
The results of the analyses of the effluent from the Imhoff tank showed a reduction in turbidity and suspended solids of approximately 50 per cent, and although the tests showed an increase in oxygen consumed from 42 to 43 parts per millon, the tank was apparently producing satisfactory results.

The results of the analyses of the effluent from the final settling tank showed a reduction in turbidity of about 92½ per cent, as compared with the raw sewage, a reduction of 85 per cent, as compared with the effluent from the primary settling tank and indicated a fairly high degree of clarification. The suspended solids, however, were considerably higher than in the effluent from the primary settling tank, although somewhat lower than in the raw sewage. This conforms very closely with the conditions found from the inspection, which showed that the final settling tank which had not been cleaned for about 6 months, was nearly full of sludge and large quantities of finely divided particles of sludge were being carried over the outlet weir into the effluent channel.

That the sprinkling filter, nothwithstanding the poor distribution, gave a fairly high degree of purification, was indicated by the reduction of oxygen consumed of 50 per cent, and a reduction of bacteria of about 87½ per cent.



Imhoff Tank of Sewage Disposal Plant at Newark



Sprinkling Filter and Dosing Tank of Sewage Disposal Plant at Newark

The nitrates, however, were low for this type of plant. This was, in all probability, due to a denitrification of the effluent from the sprinkling filter and was to be expected from the conditions of the final settling tank which, as indicated above, was nearly full of sludge, and since septic action was taking place in the tank, as indicated by the formation of scum on its surface and the rising of bubbles of gas.

From the inspection of the condition of the sewage disposal works and after a careful consideration of the operation of the works, of the results of the analyses of sewage and sewage effluent and of the condition of Military brook into which the effluent from the works is discharged, the following conclusions are drawn:

1. That the industrial wastes, if any, discharged into the sewer system from the chemical plant of C. H. Stewart & Co. on Van Buren street, did not appear to have any germicidal effect on the sewage collected at the time of the inspection.
2. That the discharge of wastes from the chemical works of the Commonwealth Chemical Co. has, in all probability, a germicidal effect on the sewage, but that the wastes at the time that the samples were collected were not of sufficient strength or volume to have any appreciable effect on the sewage at the disposal works, or on the operation of these works.
3. That the screen chamber and Imhoff tank appeared to be operated properly and to give a satisfactory degree of primary treatment of the sewage.
4. That no changes have been made in the construction and operation of the pumping station since the last inspection with the result that settled sewage is allowed to by-pass the sprinkling filter and discharge into Military brook during the pumping of sludge.
5. That the capacity of the siphon in the dosing tank had probably been reached under conditions of uniform flow, and under the condition of intermittent flow caused by the intermittent pumping of sewage, the siphon is of insufficient capacity to allow the siphon to break, which results in the greater part of the sewage being applied to the sprinkling filter under a small head, giving poor distribution.
6. That the sprinkling filter appeared to give a fair degree of purification even under the poor conditions of distribution found to exist.
7. That the final settling tank is not cleaned sufficiently often to give satisfactory results.
8. That since the village of Lyons has abandoned the use of Ganargua creek as a source of public water supply and it should not be necessary to install a sterilization plant to treat the effluent from the disposal works at this time.

In view of the results of this investigation I would make the following recommendations:

1. That the village prohibit the discharge of industrial wastes into the sewage system of sufficient strength and quantity to sterilize the sewage and prevent the proper operation of the sewage disposal works.
2. That the pumping station be so operated as to prevent the by-passing of the sprinkling filters and of the final settling tank during the pumping of sludge.
3. That provisions be made for so operating the pumping station or that changes in the dosing apparatus be so made as to provide for a uniform distribution of the sewage on the sprinkling filter as recommended in the previous report.
4. That the final settling tank be cleaned whenever gas is seen rising to the surface or whenever sufficient sludge has accumulated in the bottom of the tank to prevent its proper operation.

Respectfully submitted,

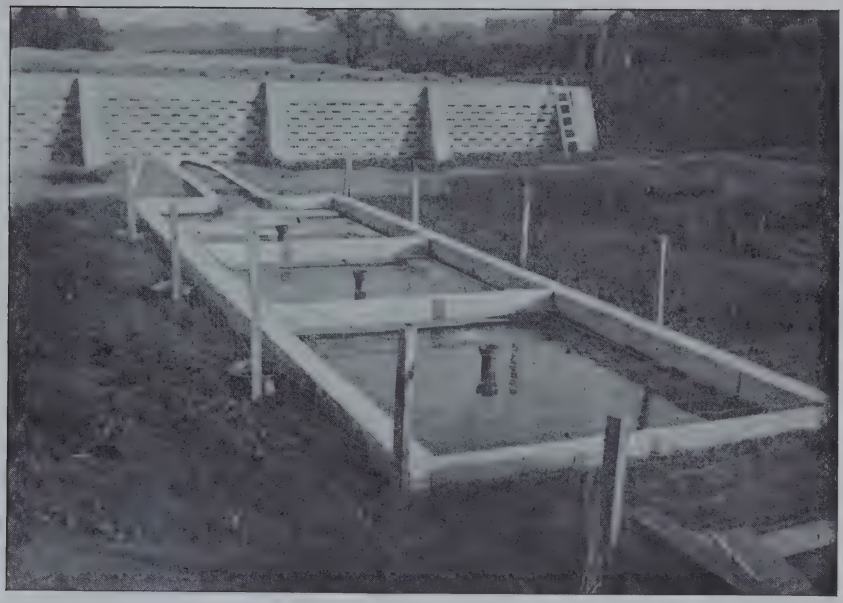
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *November* 20, 1917

RESULTS OF WATER ANALYSES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Municipality	County	Source of sample	Date of collection	PHYSICAL			CHEMICAL (PARTS PER MILLION)													BACTERIOLOGICAL			
							SOLIDS			NITROGEN AS —							HARDNESS			B. COLI TYPE + = PRESENT, — = ABSENT		
				Color	Turbidity	Suspended solids, parts per million	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Total nitrogen	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c. gelatin 20°, 48 hours	10 c.c.	1 c.c.	1-10 c.c.
Newark	Wayne	Raw sewage from sewer in Van Buren street, corner East avenue, below factory of C. H. Stewart & Co.	9/18/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13,250,000	.....	.....	.....
Newark	Wayne	Raw sewage from sewer in Hoffman street below plant of Commonwealth Chemical Co	9/18/17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	200,000	.....	.....	.....
Newark	Wayne	Raw sewage at inlet to primary settling tank	9/18/17	....	200	199	108	308	600	8.0	4.0	Tr.	11	.1	42	58	364.5	304	2,750,000	.....	.....	.....
Newark	Wayne	Effluent from primary settling tank	9/18/17	....	100	94	898	216	682	12.0	3.60	.005	24	.1	43	77	383.5	313	2,000,000	.....	.....	.....
Newark	Wayne	Effluent from final settling tank	9/18/17	....	15	158	836	303	533	7.0	1.2	.500	7	1.5	21	65	350	263	350,000	.....	.....	.....



Sprinkling Filter and Final Settling Tank of Sewage Disposal Plant at Newark

Sludge Drying Bed of Sewage Disposal Plant at Newark

NISKAYUNA

Memorandum regarding inspection of sewage disposal at school no. 4 in the towns of Niskayuna and Colonie

An inspection of the sewage disposal plant at School No. 4 in the towns of Niskayuna and Colonie was made on February 9, 1917 by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. J. R. Strong, health officer, and Mr. E. G. Atkinson, architect.

Controlled by.— Board of education, towns of Niskayuna and Colonie.

Location.— The village of Niskayuna, in southeast part of town of Niskayuna.

Population.—About 50 pupils and 2 teachers.

Plans approved.—August 8, 1916.

Works completed.— January 1, 1917.

Architect.— E. G. Atkinson of Schenectady.

Water supply.— One 6-inch driven well, located in northwest corner of basement of school. Well driven through 30 feet of sand, 4 feet of gravel and 42 feet of rock. Consumption estimated at 10 gallons per capita, or about 500 gallons per school day.

Flow of sewage.— Estimated 500 gallons each school day.

Disposal plant.— Settling tank, dosing tank and subsurface irrigation field.

Settling tank.— 4 feet by 6 feet and 5 feet deep. Capacity 900 gallons.

Dosing tank.— 2½ feet by 5 feet and 15 inches. Capacity about 100 gallons. Three-inch Miller simple automatic siphon.

Subsurface irrigation field.— Supposed to contain 400 feet of 4-inch drain tile in lines 4 feet apart.

Remarks.— Due to insufficient supply of water from well the water supply and sewage disposal system were not operating at time of inspection. They were operating part of day preceding inspection.

Settling and dosing tanks located and constructed about as shown on plan, and they were in a satisfactory condition.

The subsurface irrigation field, due to lack of graded space, had been moved much nearer the school, so that part of field was within 10 feet of school, and 20 feet of driven well. The various lines of tile pipe are covered with from 1 foot to 3 feet of sand, and the lines are from 1½ foot to 2 feet apart, although it was said by the architect that the outer ends were further apart. A blind drain has been constructed connecting ends of the various lines of drain pipe.

No evidence of trouble, due to freezing or sewage coming to surface was seen. Snow covered the area of the disposal field at the time of the inspection.

ORCHARD PARK

Memorandum regarding inspection of condition of operation of the sewage disposal plant at the Orchard Park High School

Inspection was made of this plant on March 15, 1917, by Mr. M. F. Sanborn, assistant engineer, who was accompanied by Dr. W. B. Jolls, health officer, and Mr. T. E. Morgan, principal.

Located in village of Orchard Park.

Capacity.— 420.

Attendance.— 350 pupils and 14 teachers.

Water supply.— Dug well southeast of school. Well 3 feet in diameter and 16 or 17 feet deep. Air pump pumps water into tank under pressure.

Sewerage system.— Toilets, automatic flush urinals.

Sewerage flow.— Estimated 3,500 gallons per day.

Disposal plant.— Settling tank, dosing tank and subsurface irrigation disposal field. Plant placed in operation about January of this year.

Effluent.— Supposed to pass through ground to small brook passing school.

Settling tank.— Of concrete 15 feet by 4½ feet and about 8¼ feet deep. Capacity about 4,100 gallons, or about 1 day's flow of sewage.

Dosing tank.— Of concrete, 9 feet by 4½ feet, and about 1.3 deep. Capacity 400 gallons. Four-inch simple automatic siphon.

Subsurface disposal field.— 20 lines of 3-inch diameter tile 150 feet long. Lines 4 feet center to center and laid about 1½ feet below surface on artificial fill over swampy land. One of the requirements for the approval of the plans was that the gravel fill should extend at least 20 feet north and west of the area covered by the distributing tile.

Remarks.— Gravel fill on north side of disposal field extended only about 2 feet beyond last line of pipe instead of at least 20 feet, as called for in permit and as a result the combined action of the sewage and surface water the gravel had been washed away from pipe in several places and the raw settled sewage was flowing direct to the small brook near the school.

Recommendation.— That attention of the authorities be called to the present unsatisfactory condition of the disposal field and that the recommendation that fill as called for in permit be made at once, and if necessary provision be made to prevent surface wash from erroding the field.

A communication was later addressed to the school authorities requiring the extension of the gravel fill north and west of the subsurface irrigation field as required by the Department when the plans were approved.

SALAMANCA

Memorandum regarding inspection of condition of operation of the sewage disposal plant at the West End School

An inspection of the sewage disposal conditions at this school was made on March 14, 1917, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. P. H. Bourne, health officer, Mr. George Elliott, city clerk, and Mr. Ora Winship, principal of the school.

Location.— This school is located in the west end of Salamanca, which was formerly the village of West Salamanca.

Capacity.— The school has a capacity of about 160 pupils and at the time of the inspection had an attendance of 100.

Water supply.— The water supply at the school is obtained from the city supply, and the daily consumption was estimated at about 1,500 gallons.

Sewage facilities.— Separate toilets and wash basins are provided for the boys and girls in the school. The boys' urinals are flushed by a constant flow of water.

Disposal plant.— The disposal plant consists of a settling tank, a dosing tank and a subsurface irrigation field. The disposal plant was constructed during the fall of 1916.

Settling tank.— The settling tank is of concrete, 6 feet 6 inches by 6 feet 10 inches in plan, and has an available depth of 3 feet 9 inches. This tank has a capacity of about 1,250 gallons or nearly one day's consumption.

Dosing tank.— The dosing tank is of concrete, 2½ feet by 6½ feet in plan and about 21 inches deep. The capacity of this tank is about 150 gallons.

Subsurface irrigation field.— The subsurface irrigation field contains about 1,000 feet of 4-inch and 5-inch agricultural tile pipe, laid from 2 to 3 feet below the surface in about 24 lines, each line being about 42 feet long. The soil is of coarse sand and gravel.

Remarks.— Siphon in dosing tank not operating and gate in diverting chamber not installed as called for on original plans and several large stones were seen in the pipe at the diverting chamber.

Recommendation.— It is recommended that a letter be written to the board of education calling attention to the inoperative condition of the siphon in the dosing tank, and to the omission of the two-way valves in the diverting chamber, and to the stones in the pipe at the diverting chamber.

On April 6 a communication was addressed to the board of education of Salamanca urging them to carry out the above recommendations.

SCHENECTADY COUNTY TUBERCULOSIS HOSPITAL

Memorandum regarding inspection of condition of operation of sewage disposal plant receiving the sewage from the Schenectady County Tuberculosis Hospital

An inspection of this plant was made on March 8, 1917, by Mr. M. F. Sanborn, assistant engineer, who was assisted at the time of the inspection by Dr. Peter McPartlon, superintendent.

Location.— The hospital is located in the eastern part of the town of Glenville, Schenectady county, and is about 5 miles northeast of the city of Schenectady.

Population.—At the time of the inspection there were about 68 patients and 13 employees at the hospital.

Water supply.—Water is pumped from a brook passing through hospital grounds. All water is filtered and sterilized before being used. The average consumption was estimated from meter records to be about 6,200 gallons per day.

Sewage flow.— The sewage flow was estimated to be the same as the water consumption, that is, 6,200 gallons per day.

Sewage disposal works.— These works consists of a settling tank and a dosing tank constructed in 1912; and a sprinkling filter, a secondary settling tank, a dosing tank and 4 sand filters constructed in 1915. All of that portion of the plant constructed during 1915 is under one frame roof.

Effluent.— The effluent is discharged into a small brook tributary to Alplaus Kill.

Settling tank.— This tank is constructed of concrete and was originally divided into two compartments, one being 8 feet square and the other 5 feet by 5 feet 8 inches. Both compartments were about 4½ feet deep. The partition separating these two compartments has been removed, so that it is now one tank, having a capacity of about 3,100 gallons. This gives a theoretical detention period of about one-half day with the amount of sewage as found during the inspection.

Dosing tank.— This tank is 2 by 2¼ feet in plan, and a working depth of about 4 feet. A 5-inch simple automatic siphon discharges about 135 gallons at each dose to the sprinkling filters.

Sprinkling filters.— The sprinkling filter is 10 by 38 feet in plan and 6 feet deep. The sides and bottom are constructed of concrete and the filtering material consists of broken stone varying from ¾ inch to 2 inches in size. There are four nozzle risers, upon which there were intended to be placed square distributing nozzles. The underdrains consist of lines of 6-inch half round tile 11-inch center to center placed on the bottom of the filter and draining to a main drain leading to the secondary settling tank. The filter has an area of 380 square feet, and at the time of the inspection was being operated at the rate of 713,000 gallons per acre per day, which corresponds to about 120,000 gallons per acre per foot in depth per day.

Secondary settling tank.— This tank is of concrete, 4 by 5 feet in plan at the top and 2½ by 3 feet in plan at the bottom and 6½ feet deep. A sludge drain pipe removes the sludge from the bottom of the tank and conveys it to sludge trenches located below the plant. The tank has a capacity of about 800 gallons and gives a theoretical detention period of about 3 hours.

Dosing tank.— This tank is 3 feet 1 inch by 4 feet in plan at the top, and 3 feet by 3 feet 1 inch at the bottom, and it has a working depth of about 2 feet. It has a capacity of about 160 gallons. A 5-inch simple automatic siphon discharges the contents intermittently to the sand filters.

Sand filters.— There are four sand filters about 13 by 18 feet in plan and each filter has an area of about 241 square feet. The filters were designed to contain about 2½ feet of sand, of an effective size from .35 to .47 mm. The four filters combined have a total area of about .022 acre, and at the time of the inspection was treating the sewage at the rate of about 282,000 gallons per acre per day.

Sludge disposal.— Sludge from the primary and secondary settling tanks is supposed to be discharged into sludge trenches. These trenches could not be seen at the time of the inspection on account of the snow and they have probably never been used.

General remarks.— The primary settling tank was full of sludge and scum. No sprinkling nozzles were in place on sprinkling filter and sewage flowed out through the risers and passed through filter without proper aeration and distribution. Much pooling was noticed on the surface of the filters.

The siphon and dosing tank was not operating properly and sewage flowed continuously to sand filters.

The sand filters were not being properly maintained, since sewage was standing about 6 inches on the surface of the filters and much scum had accumulated on the surface of the sand. The entire depth of sand was apparently flooded with sewage, showing that the underdrains were not properly taking care of effluent.

Sludge disposal not satisfactory, inasmuch as no efficient drying and final disposal had been provided for.

The superintendent, Dr. Peter McPartlon, requested of the inspector that the Department issue simple directions for operating and maintaining the disposal plant.

Recommendations

1. Construct properly underdrained sludge drying bed of sufficient size.
2. Remove sludge and scum from primary settling tank to sludge bed and at no time should the sludge and scum in the tank occupy more than one-third of the capacity of the tank.
3. A cover should be provided for the dosing tank.
4. Always keep nozzles on sprinkling filter except when removed for cleaning.
5. If sewage appears to pool on the surface of stone, pick up the upper foot or so to break up the scum.
6. Place siphons in proper operating condition and always maintain them efficiently.
7. Remove sludge from secondary settling tank at frequent intervals, especially if septic action takes place. Septic condition may be indicated by a scum forming on surface or by gas and particles of sludge rising to surface.
8. Remove scum from surface of sand filters and give them a complete overhauling, and also place underdrains in a satisfactory condition.
9. It is further recommended that a set of instructions for the operation of the disposal plant be issued and that two copies of these instructions be furnished to the superintendent of the hospital.

Directions for operation of sewage disposal plant at Schenectady County Tuberculosis Hospital, in the town of Glenville

The sewage disposal plant consists of a settling tank, a primary dosing tank, a sprinkling filter, a secondary settling tank, a secondary dosing tank, 4 sand filters and a sludge disposal field, and all sewage from the hospital buildings passes through the various parts of the filters in the order mentioned.

Settling tank.— The settling tank has a capacity of about 3,100 gallons. It should occasionally be cleaned of scum and sludge, and at no time should more than one-third of the capacity of the tank be occupied with the scum or sludge.

Dosing tank.—Always see that the siphon of the dosing tank is maintained properly. If the siphon should get out of order an attempt should be made to repair it and if this is not possible then a mechanic from the makers of the siphon should be sent for to place it in a proper operating condition.

Sprinkling filters.— Nozzles should be looked over every day and kept free of any material that would clog them. Nozzles should always be in place and an extra nozzle provided to replace any which may become broken. If the surface of the filter appears to clog, it should be picked up for a depth of from 1 to 2 feet.

Secondary settling tank.— Keep tank comparatively free of sludge, and if tank at any time shows sludge or gas rising to surface remove sludge to sludge drying beds.

Secondary dosing tank.—Always keep in efficient operating condition, and if the siphon gets out of order repair as directed above for the main dosing tank.

Sand filters.— Operate 3 of the sand filters at a time and allow each filter to rest for about 3 days in every 12. When a filter shows signs of clogging on surface cut it out of service long enough to allow scum to be dry sufficiently to be easily removed. Do not rake the scum into the sand bed. During winter the beds should be ridged to permit any ice forming on filters to be supported on the ridges.

Sludge disposal.— Sludge discharged on sludge bed, after drying sufficiently to be easily handled, should be buried or placed on dump and covered with ashes or other suitable material. Sludge should not be placed where it can be readily washed into the creek. Provide plenty of ventilation in main disposal plant except during coldest months in the winter.

Keep a record book in which should be entered dates of cleaning the settling tanks, dates of final disposal of sludge, dates of picking over surface of sprinkling filters, the number of sand filters in use (No. 1 filter being the nearest to the final settling tank, No. 2 filter nearest to dosing tank, No. 3 being the other filter adjacent to No. 1 and No. 4 being other filter adjacent to No. 2), and any other data such as removal of scum from surface of sand filters, etc., which might be of service in the future operation of the plant.

April 4, 1917

VAN ETTEN

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an inspection of the sewage disposal plant now under construction at the new school building in the village of Van Etten, Chemung county, made at your direction and as the result of a protest from an adjacent property owner against the construction of the plant on the grounds that he feared pollution of his well would occur from the operation of the plant as constructed. The inspection was made by Mr. C. A. Holmquist, in company with Dr. J. W. Gee, health officer of the village, Mr. B. B. McDowell, president of the board of education, and Mr. Robert Brougham, complainant, on November 21, 1916.

The village of Van Etten, which had a population of 407 in 1915, according to the last State census, is located in the town of Van Etten, in the eastern part of Chemung county, about 15 miles north of Waverly. It is situated in the low flat triangular basin at the junction of Langford and Cayuta creeks, tributaries of the Chemung river. It is surrounded by high hills, which rise to an elevation of about 1,700 feet above sea level, or about 700 feet above the average level of the village itself.

It appears from data obtained at the time of the inspection that the soil in the greater part of the village consists of a top soil of gravelly loam, below which is a stratum of coarse porous gravel from 10 to 12 feet deep, which in turn overlies a stratum of clay from 18 inches to 2 feet thick. Below this clay is a stratum of water-bearing gravel approximately 20 feet thick overlying a second layer of heavy dense clay about 3 feet thick, which in turn overlies a second layer of water-bearing gravel about 35 feet in depth, below which is a third stratum of clay.

The village has neither a public water supply nor a public sewerage system. The individual houses are provided either with driven or drilled wells which are sunk into either the first or second stratum of water-bearing gravel. It was alleged that water supplies cannot be obtained from ordinary shallow dug wells, inasmuch as the stratum of coarse gravel above the first layer of clay does not contain ground water except during certain portions of the year and that even the wells driven into the first layer of water-bearing gravel become dry after long periods of drought.

It was stated by the health officer that after long droughts the water in the wells driven into the first layer of water-bearing gravel drops to from 25 to 35 feet below the surface and that the water level does not begin to rise in these wells until from 48 to 96 hours after heavy rains. It was also stated that in the 64-foot well at the school, drilled into the second layer of water-bearing gravel, water was found at a depth of 40 feet below the surface. This would seem to indicate that there is probably at present no direct local connection between the top layer of gravel and the first layer of water-bearing gravel, nor between the two layers of water-bearing gravel.

Most of the houses in the village are provided with fairly deep vault privies, and it was alleged that these deep vaults rarely require cleaning, inasmuch as the flow of ground water through the porous top layer of gravel during spring freshets dilutes, hydrolizes and carries away the greater portion of the contents of the vaults. The school house is at present provided with two vault privies about 8 or 9 feet deep which, it was stated, had not been cleaned during the past 15 or 20 years. One of the privies was nearly empty and the other was nearly full. It appeared that the filling up of the latter privy was due partially to the caving in of the sides. The property of the complainant is also provided with a vault privy about 8 feet deep, located 43 feet from his drilled well. The lower portions of the walls of this privy are laid with loose stone.

The matter of providing sewage disposal for the new school located in front of the existing school on one of the main streets in the village, was first taken up with this Department by the architect for the school at a conference in this office on March 14, 1916, at which time the local conditions were discussed and the requirements of this Department were reviewed with the architect. Plans for sewage disposal for the new school after having been modified to meet the requirements of the Department were approved on May 16, 1916.

These plans provided for a sewage disposal plant consisting of a settling tank, dosing tank and a subsurface irrigation system, divided into two sections to be located in the southwestern part of the school property. The plans were designed to care for an ultimate population of 175, the present attendance at the school being about 120. According to the report of the architect, submitted with the plans, the nearest line of tile of the subsurface irrigation system would be 70 feet from a driven well 50 feet deep, located on the adjacent property. After a careful examination of plans and consideration of local conditions and in view of the absence of public water supply and sewerage systems they were approved as noted above on May 16, 1916.

The recent inspection showed that the sewage disposal plant is located approximately as shown by the approved plans. The disposal plant site had been partially back filled, so that it was impossible to determine with any degree of accuracy as to the number of feet of tiling already laid in the subsurface irrigation system. The president of the board of education, under whose direction the plant has been constructed, stated that approximately 500 feet of tiling had been laid so far and that these lines had been laid with slopes of .5 per cent from levels furnished by the contractor of the schools.

The house of the complainant is located 44 feet from the property line of the school and has two wells, one a driven well located under the kitchen and the other a drilled well located outside of the building. The drilled well is cased, but it did not appear to be adequately protected from surface wash, inasmuch as it was not hermetically sealed and since the top of the casing was carried only a few inches above the surface of the ground. Each of these wells is 56 feet from the property line of the school.

Although two trenches had been excavated within 4 feet of any property line of the school and one of these within 60 feet of the wells of the complainant the end of the nearest line of tile was about 85 feet from these wells. There appeared to be sufficient area available on the school property to permit of installing enough lines of tile to serve the probable needs of the school without laying them within 70 feet from the well of the complainant or within 15 feet of his property line. In fact the president of the board of education stated that he does not intend to carry the lines of tile as close to the property line as shown by the excavation and that in all probability it would not be necessary to lay the lines any closer than the nearest present line of tile, which is about 85 feet from the well of the complainant.

In conclusion, I would state that it was found from the recent inspection that the sewage disposal plant at the Van Etten school is being constructed in general accordance with the plans for sewage disposal approved by this Department on May 16, 1916. The means for disposing of the sewage on the school property is as little likely to pollute the wells in question as any method that might be adopted for caring for the sewage from the school on the school premises.

The question of pollution of these wells is one that always exists in a village not provided with a public water supply. Under such conditions it is impossible to safeguard private well water supplies and water of a satisfactory sanitary quality cannot be obtained except from public supplies derived from unpolluted sources.

The sewage disposal plant at the school should nevertheless be carefully constructed in accordance with the approved plans and no line of tile should be laid within 15 feet of the westerly property line of the school or less than 70 feet from the wells of the complainant as contemplated by the approved plans. It would be well also not to extend the lines farther in a northerly direction than necessary.

As previously pointed out to the complainant, however, irrespective of any possibility of the pollution of the wells on his property by reason of the construction of the sewage disposal plant at the school, I do not believe that any revocation of the approval of the plans should be considered, since any effect on the quality of the water in the well is problematical and more properly a matter for private action through the courts should any grounds of damage result from the construction and operation of this disposal plant.

In view of the above, I would recommend that copies of this report be sent to the complainant, to the health officer and to the board of education, and that the board of education be advised that the approved plans should be followed in laying the subsurface irrigation system and that no line of tile should be placed within 15 feet of the westerly property line of the school.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *December* 1, 1916

Copies of the above report were transmitted as suggested.

WATERLOO (town)

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to submit the following report on an inspection of the wastes disposal plant at the gas works of the Semet-Solvay Company near Geneva, made at your direction and as the result of the complaint of tastes in the water of the public water supply of the village of Waterloo furnished by the Waterloo Water Company.

The inspection was made by Mr. C. A. Holmquist, assistant engineer, of this Department, on July 17, 1917, in company with Mr. H. L. Moore, superintendent of the gas works. These works are located in what is known as Broder City in the town of Waterloo just east of the city of Geneva. The Semet-Solvay Company manufactures illuminating gas, coke and such gas works by-products as tar, light oil and ammoniacal liquor at these works. The company employs about 125 men and the operation of the works is continuous for 24 hours during the day.

The wastes from the works consist of about 50,000 gallons of waste water from the ammonia machines, 150,000 gallons of cooling water or wastes from the light oil recovery process, 500,000 gallons of coke-quenching water and gas engine cooling water and the sanitary sewage contributed by the 125 employees.

On April 10, 1916, plans for the disposal by sedimentation and filtration through coke of the wastes from the ammonia machines and from the light oil process were approved by this Department, and on May 5, 1916, amended plans providing for a change of location of the disposal plant were approved. The permit issued in connection with the approval of original plans contains in addition to the usual revocation and modification clauses the following conditions:

1. That both the sewers and sewage disposal works shown by the plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
2. That no sewage sludge from any part of the disposal works shall be discharged into Seneca canal or any other watercourse or body of water.
3. That satisfactory provisions shall be made for the operation of the plant during high water stage in the canal.
4. That whenever required by the State Commissioner of Health, sanitary sewage shall be separated from wastes and treated in an independent sewage disposal plant and that whenever required by the State Commissioner of Health the plant shall be enlarged or provision shall be made for reducing the amount of wastes tributary to the plant.

According to the plans and data submitted with the amended plans approved on May 5, 1916, the new location of the plant would be such that its operation would not be affected by high water and also permitted of separating the gas engine cooling water, which is not polluted, and the coke-quenching water, which it was stated contains only particles of fine coke, from the more objectionable ammonia wastes and light oil wastes which would be treated in the proposed disposal plant, thereby greatly reducing the quantity of wastes to be treated.

The recent inspection showed that the plans for the disposal of wastes had been carried out in substantial accordance with approved plans. The plant for the treatment of the ammonia machine and light oil wastes consists of a wooden tank 80 feet long divided into two parallel compartments 10 feet wide each with an average depth of about 4 feet below the flow line. The 60-foot section of each of the two compartments nearest the outlet is used as a settling basin and the 20-foot sections at the lower end of the tank are filled with coke and used as coke filters through which the wastes flow laterally after passing through the settling basins. The coke filters consist of a central section of fine coke placed between sections of coarse coke held in place

by means of coarse screens. The light oil wastes are passed through two oil catchers consisting of small baffled concrete settling tanks before they are discharged into the disposal plant.

Under normal operating conditions the waste water passes through one-half of the plant for a period of one week and through the other half the following week. The sludge which accumulates in the settling basins and the fine coke in the filter are removed from one of the compartments each week and the coarse coke is removed every other week. The sludge, which consists largely of lime used in the treatment of the ammoniacal liquors, is deposited on a sludge bed constructed of coke near the disposal plant. The coke removed from the coke filter is burned under the boilers of the gas works.

It was found, however, at the time of the inspection, that the plant had not been cleaned for a period of 3 weeks, because one dredge used in cleaning the plant had been used for other purposes. As a result one of the tanks was practically filled with sludge and although the disposal plant removed nearly all of the oil from the wastes it removed comparatively little of the solids in suspension. It is possible that such improper operation of the disposal plant in the past gave rise to the tastes in the Waterloo water supply complained of.

Although the effluent from the plant had a reddish brown color it was fairly clear, indicating that the disposal plant was giving fairly efficient results and removed most of the suspended solids and practically all of the oil in the wastes. The effluent from the disposal plant is discharged into a ditch and thence into the old Seneca canal located about one-fourth mile south of the works.

The coke-quenching water contains fine coke in suspension and traces of oil are passed through large lagoons located on the property of the company before it is discharged into a ditch leading to the Seneca canal. These lagoons appeared to remove practically all of the finely suspended coke and the effluent from them was fairly clear although somewhat discolored.

The sanitary sewage contributed by the 125 employees at the works is passed through a settling tank and thence into the lagoons which receive the coke-quenching water. The effluent from the settling tank was fairly clear, due in all probability to the large dilution of the sewage.

The old Seneca canal into which the effluent from the disposal plant and lagoons is discharged extends from a point near the center of the city of Geneva easterly near the north shore of Seneca lake to the Seneca river, a distance of about 2 miles. There appeared to be comparatively little flow in the canal and the water in the canal was discolored, due largely to the wastes from the coke works. The discoloration of the water in the canal had, however, almost disappeared before it reached the lower Lehigh Valley Railroad bridge over the Seneca river, about 500 feet below the junction of the Seneca canal with the Seneca river. This bridge is located about 4 miles above the intake of the Waterloo waterworks.

It was learned from the superintendent of the Waterloo waterworks that no complaints of tastes in the water had been received for some 2 or 3 months. It was also learned from the superintendent of the Semet-Solvay Company that one of their chemists had made a series of analyses of the influent and effluent from disposal plants and from the water collected from the Seneca canal and the Seneca river at various points with a view of ascertaining the efficiency of the disposal plants and in order to co-operate as far as possible with the Waterloo Water Company in preventing pollution of the source of water supply furnished by this company.

In conclusion, I would state that it is found from the investigation that the disposal of the sewage and wastes from the works of the Semet-Solvay Company had been carried out in substantial accordance with plans approved by this Department and that the disposal plants when properly operated appeared to be fairly efficient and seemed to remove a large percentage of the solids in suspension and practically all of the oils from the wastes. It is important, however, that the disposal plant for the treatment of the ammonia machine wastes and light oil wastes should be carefully operated and that it should be cleaned regularly every week.

In view of the above, I would recommend that copies of this report be sent to the Waterloo Water Company and to the Semet-Solvay Company and that the latter be requested to take the necessary precautions to operate the plant properly and to clean it regularly.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July* 30, 1917

A copy of this report was later transmitted to the Semet-Solvay Company, who assured the Department of their intention to provide adequate continuous operation of the treatment works.

MOSQUITO EXTERMINATION (NASSAU COUNTY)

Chapter 408 of the Laws of 1916, which authorized the appointment of the Nassau County Mosquito Extermination Commission, provides that the Commission shall file with the State Commissioner of Health on or before the first day of September in each year a detailed estimate of the moneys required for the ensuing year, a plan of the work to be done and the methods to be employed, together with a general description, etc., of the lands on which the work is to be carried on.

The law further provides that the State Commissioner of Health shall have the power to approve, modify or alter such estimates, plans and methods and that such estimates, plans and methods finally approved by him shall be forwarded by him to the board of supervisors in the county on or before the first day of October following its receipt. The law also requires that a report shall be submitted by the Mosquito Extermination Commission to the State Commissioner of Health on or before the first day of September in each year, setting forth the amount of moneys expended during the previous year showing each item of expenditure, the methods employed, the work accomplished, etc.

Such estimates, plans and methods covering the work proposed for 1918 were submitted to and approved by the State Commissioner of Health and forwarded to the proper county authorities. The annual report referred to above was also received and placed on file.

Below will be found the communication covering the estimates, plans and methods of the Nassau County Mosquito Extermination Commission proposed for 1918, the report of the Chief Engineer on these estimates, plans and methods and the annual report of the Commissioner detailing the expenditures for the previous year.

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

The following is submitted as a plan of organization, outline of work and budget of estimated expenses adopted by the Nassau County Mosquito Extermination Commission at the meeting of August 24, 1917, for the year January 1, 1918, to January 1, 1919:

In planning for new drainage projects as well as for maintenance of ditches the aim has been to maintain continuity with the work already accomplished by both the commission and private organizations. While actual drainage is largely confined to certain localities, the needs of the entire county have been considered. In general outline the plan is as follows:

1. The continuation of the drainage of the south shore marshes, beginning at the point left off in the 1917 contract, and continuing along the mainland as far east as Seaman creek.
2. The elimination of two large fresh water breeding areas in Great Neck and Oyster Bay.
3. The beginning of the fresh water drainage on the south shore, starting from the New York city line east to Mill river and Smith pond, just west of Rockville Centre. The northern boundary, as shown on the accompanying map, would start on the west at the Merrick road and continue as far as Valley stream. From there it would run far enough north to include Lynbrook.
4. A systematic inspection and oiling in the six north shore districts, to include house to house inspections in the main villages.
5. Thorough maintenance of all salt and fresh water ditching on both the north shore and the south shore.
6. Inspection and oiling of swamps and ponds on the south shore from the city line east to Freeport.
7. Map making, surveys and plans for the future.

Organization

As a large part of the field force is only temporarily employed, the organization will necessarily vary considerably throughout the year. However, an adaptation of that which has been used this year, and which is here outlined, will furnish a satisfactory working basis. This provides for a field force of 15. It provides for expert supervision of contract work, 3 inspectors for the ditched salt meadows, 2 for inland work on the south shore and 6 north shore inspectors to cover the 6 outlined districts.

The local breeding places in the middle of the county are comparatively few as compared with both the north and the south shore. There is very little malaria. Further, the salt marsh drainage on the south shore will be a benefit to the middle of the county. Night collections show that nearly all of the mosquitoes in the middle part of the county are Aedes Sollicitans which have migrated from the south shore marshes. For these reasons it seems reasonable to concentrate mainly on the north and the south shore with an office for each division.

Budget January 1, 1918, *to January* 1, 1919

Total Budget, $48,000

			Per cent
I. Expenses of commissioners		$100	.2
II. Salaries.			
1. Secretary (including expenses)		2,000	4.2
2. Field force.			
(a) Chief engineer	$2,700		
(b) Division inspector, 4 mo.	600		
(c) Assistant engineer	1,620		
(d) General inspector, 4 mo.	500		
(e) Clerk and stenographer	780		

(f) Inspectors and assistant inspectors.			
1. South shore.			
(a) Salt marsh inspector, 6 mo. at $100	$600		
(b) Fresh water inspector, 4 mo. at $100	400		
(c) Salt marsh inspector, 4 mo. at $100	400		
(d) Two assistant inspectors, 4 mo. at $75	600		
2. North shore.			
(a) Two inspectors, 6 mo. at $100	1,200		
(b) Two inspectors, 4 mo. at $100	800		
(c) Two assistant inspectors, 4 mo. at $75	600		
		$10,800	22.25
III. New drainage projects.			
1. Salt marsh.			
(a) 650,000 ft. at $.025	$16,250		
2. Fresh water.			
(a) Great swamp, Great Neck	5,000		
(b) Mill pond, Oyster Bay	2,500		
(c) Miscellaneous, north shore (co-operation with property owners)	500		
(d) Rockaway peninsula, miscellaneous	2,000		
		26,250	55.
IV. Maintenance and patrol.			
1. Cleaning 3,174,000 ft. salt marsh ditching, south shore, at $.0012	$3,809		
2. North shore, 125,000 ft. at $.0015	191		
3. North shore, fresh water ditching and cleaning of ponds	1,000		
4. Patrol of all ditching in summer, 3 men for 11 weeks	500		
		5,500	11.
V. Permanent equipment.			
1. Motor boat	$600		
2. 10 bicycles at $25	250		
3. Surveying instruments, tide gauge, office equipment, miscellaneous	500		
		1,350	2.8
VI. Supplies.			
1. 100 bbls. fuel oil at $5	$500		
2. Freight	75		
3. Gasoline, oil, etc	275		
4. Laborers' boots, 25 prs. at $3.50	75		
5. Tools	75		
		1,000	2.1
VII. Current expenses.			
1. Rent	$300		
2. Printing (including reports)	200		
3. Light, heat, telephone, miscellaneous	300		
4. Traveling expenses of field force	100		
5. Insurance, etc	100		
		1,000	2.1
Total		$48,000	

Expenses of the commissioners

The first item is to cover the necessary traveling expenses of the Commissioners.

Salaries

The year 1918 will be an extremely important stage in the history of mosquito extermination in Nassau county. The commission will have started at the third year with over one-half of the salt marshes drained. Definite results may be expected from the salt marsh ditching in nearly all parts of the county, particularly the western part. A carefully planned campaign against malaria should accomplish to a large extent the elimination of new cases of malaria on the entire north shore.

A well organized force is imperative for the accomplishment of such a large undertaking. A general inspector is needed throughout the summer to make any necessary surveys or inspections of territory, to assist property owners who may be desirous of doing their own drainage. On the south shore three inspectors will be needed for the three districts on the drained salt marshes, leaving one inspector and one assistant for fresh water inspections and oiling. Six inspectors on the north shore should be sufficient to watch closely all breeding places and provide some immediate method of elimination. The entire north shore has been carefully divided into six inspection districts, which should serve as permanent districts for that part of the county. These districts as outlined on the map are as follows:

1. Great Neck peninsula to Mitchell avenue.
2. Manhasset Neck, including Manhasset, Plandome, Port Washington, Sands Point.
3. Roslyn, Searington, Albertson.
4. Sea Cliff, Glen Cove, Glen Wood.
5. Locust Valley, Lattingtown, Mill Neck, Bayville.
6. Oyster Bay, Centre Island and vicinity.

About 60 per cent of the salaries will be devoted to the south shore and 40 per cent to the north shore. The percentage on the north shore is larger in proportion to the amount of work paid for by the commission but includes drainage paid for by property owners and also includes house to house inspections.

Salt marsh drainage

In the past year of its existence the commission has expended approximately $16,000 of its appropriation for salt marsh drainage. Adding to the cost of this ditching that of executive expenses in handling this drainage work, the amount which the commission has expended for drainage work itself approximates 50 per cent of its entire budget. Up to this time this has not been a disproportionate amount, since the salt marsh drainage was the largest and most costly project confronting the commission. However, slightly over 50 per cent of the marsh drainage necessary will have been installed by the end of the season and the work carried far enough eastward to afford practically complete immunity to the western portion of the county.

This fact, together with the following considerations, makes it advisable to reduce the amount of salt marsh ditching to be put in next year to 650,000 feet. The most important reason for this is the fact that so far, except for maintenance work, the commission has spent little or nothing for fresh water work either on the north shore or the south shore, and there remains a great deal of it to be done. There are two or three important fresh water drainage projects on the north shore which should be undertaken as soon as practicable and which will cost considerable. On the south shore we are spending money at the present time oiling fresh water breeding areas which could easily be filled or drained. By the end of this year the salt marsh drainage work will have been carried so far east that it will be necessary to carry on more fresh water work on the south shore than is now the case.

There is also the item of cost. With the increased cost of labor the cost of ditching is constantly increasing. In the spring of 1916 salt marsh contracts were let for about 1¾ cents a foot; last fall the price had increased to about 2 cents; this summer 2 2/5 cents seems the average figure. The estimated cost of the work for next year is 2½ cents per foot. At a price of 2½ cents per foot the cost of a million feet amounts to $25,000, more than half the appropriation for the year. The cost of 650,000 feet at 2½ cents per foot would be $16,250.

The area to be drained during 1918 is the large section of mainland meadow eastward from Freeport creek to Seaman creek, an area of about 2,000 acres. The islands to the south of this can be drained in 1919 and the remainder of the county can be drained in 1920 and 1921, as seems best.

The additional ditching which has been cut on the 1916 contract will make it possible to go this year beyond Freeport creek, the boundary originally planned for 1917. Approximately 56,800 feet is estimated as the surplus. This leaves 650,000 feet of the 706,800 feet needed between Freeport and Seaman creeks, for which provision is made in this budget.

Description of meadows

While there is no strict uniformity, these marshes may roughly be divided into three fairly well defined divisions.

1. *Outer marsh.* The marsh nearest the bay is usually low enough to be affected by every monthly tide. For the most part the meadows are solid but softer than the upland marsh with occasionally low places having little or no vegetation. Here surface breeding is frequently found.

2. *Middle marsh.* The adjacent meadows are somewhat higher and usually more solid with less frequent salt holes. These meadows usually but not always are affected by monthly tides and frequently by heavy rains. The salt hay is heavier and of a better quality. The ditching of these meadows is comparatively simple.

3. *Upland marsh.* There are five main creeks within this area that extend well up into the uplands, four of which are the continuation of fresh water streams. Bordering these streams and at the extreme edge of the marshes are characteristic upland meadows. The vegetation, which varies according to the soil, may be either "three square" or fine salt hay. These meadows are affected only occasionally by the tides. After heavy rainfalls heavy breeding is common. Drainage is somewhat more difficult because soil is frequently about the regulation 30-inch depth.

On the whole, the meadows should give no exceptional difficulties in drainage.

Fresh water drainage

(a) Great swamp, Great Neck, is the largest drainage problem on the north shore in the eastern part of Nassau county. This swamp covers approximately 175 acres of possible breeding area. The drainage of this swamp will mean the elimination of the worst breeding place on the Great Neck peninsula.

New ditching required:
Straight line, Plan 1, 10,150 feet.
Broken line, Plan 2, 10,700 feet.
Average depth of main ditches, 3 feet.
Width of main ditches, 4 feet.
Deepest cut, 6 feet.
Extra work needed:
Lowering culvert, filling.
Estimated cost, $5,000.

(b) The Mill pond at Oyster Bay is situated very close to a large part of the population. Anopheles breeding has been located around this pond. At the upper end is a swampy area, which is the probable source of the malaria in that part of the village.

Estimated ditching needed, 5,000 feet.
Estimated area to be excavated, 75,000 square feet.
Cleaning of edges, 2,400 lineal feet.
Estimated cost, $2,500.

(c) Five hundred dollars is designated for miscellaneous drainage work on the north shore. This is intended for places where property owners are willing to pay a large proportion of the expenses provided the commission will also pay a part. This amount is reserved for this purpose, to be expended throughout the year by the commission at the recommendation of the chief engineer and division inspector.

(d) Two thousand dollars in addition to the amounts expended by property owners will be sufficient to eliminate the important fresh water breeding places on the Rockaway peninsula. The fresh water drainage will follow systematically the salt marsh drainage from the New York city line east. As the places are few, this should be sufficient to extend along the south shore as far east as Mill river just west of Rockville Centre.

This includes the following:

1. Valley Stream reservoir to Watts pond and outlet. Cleaning of stream, 6,300 feet; Watts pond (lineal feet), 2,000 feet; new ditching, 1,000 feet; extra work needed; total cost, $400.
2. Stream north of Queens county pumping station running to junction of Merrick Road and Hempstead branch of L. I. R. R. Cleaning of stream, 5,600 feet; new ditching, 2,000 feet; new ditching and cleaning, 1,500 feet; culvert; total cost, $500.
3. Stream from Lynbrook to Queens county waterworks north of Broadway. Cleaning of stream, 13,500 feet; total cost, $400.
4. Mill River-Smith pond. Cleaning and new ditching, 1,500 feet; cleaning of ponds; total cost, $300.
5. Miscellaneous. Smaller projects on Rockaway peninsula, $400; total cost of five projects, $2,000.

Maintenance

The estimate for maintenance on the south shore is based on the average cost per foot of 1916 ditching maintained in 1917. This should be about the same in 1918. Both the north shore salt water and fresh water maintenance are based on the actual cost of the same work in 1917. As there have been only slight changes these will remain almost the same.

The maintenance of the salt marsh ditching on the south shore will become a problem of increasing importance each year. By the beginning of 1918 approximately three and a quarter millions of feet will have been cut and consequently need cleaning. This work should begin as early as weather permits in the spring.

After the completion of the maintenance a small force of laborers can control the ditching.

Permanent equipment

The larger items under permanent equipment need explanation.

On the south shore the problem of transportation will increase in importance with that of maintenance. Next year, there will be 67 islands besides the mainland marshes, many parts of which are most accessible by boat. With continued work on the contract ditching carried on simultaneously with maintenance, two motor boats will be indispensable. Even this year one motor boat would not have been sufficient had it not been for the fact that a foreman was secured who used his own motor boat. This arrangement may not be possible another year.

After this year new bicycles will need to be purchased for the inspectors.

A tide gauge will be necessary to keep accurate records of the rise and fall of the tides in relation to the breeding conditions.

Other equipment will be needed from time to time throughout the year.

Current expenses and supplies

Under current expenses and supplies, the item for printing provides not only for stationery, but also for any reports that the commission may desire to publish and pamphlets and leaflets for educational purposes.

The endeavor has been made to divide the expenditures in such a manner as to benefit all parts of the county in so far as it is possible, and at the same time to continue a well organized and systematic plan of elimination.

It will be noted that the plans for fresh water drainage are mainly confined to the larger projects. This is with the expectation that the property owners shall bear the major part of the drainage work on their own property where comparatively small expenditures are needed. These larger projects concern many property owners so that it is difficult to secure the cooperation of all in any one scheme. Also, the expense is large in comparison with the value of the property.

The following summary of percentage will show the proportionate expenditures among the various items:

1. a. Overhead expenses	23 per cent
b. Actual drainage	66 per cent
2. a. New projects	55 per cent
b. Maintenance and patrol	11 per cent
3. a. South shore; salaries	11 per cent
Drainage	47 per cent
Total	58 per cent
b. North shore; salaries	9 per cent
Drainage	19 per cent
Total	98 per cent
4. a. Salt water	42 per cent
b. Fresh water	23 per cent

The names of the owners of property on which the commission proposed to enter appears on the last assessment rolls of the town are as follows:

(These names are not reproduced here).

Respectfully submitted,

JOHN T. PRATT,
President

ALBANY, N. Y., *August* 27, 1917

HERMANN M. BIGGS, M.D., *State Commissioner of Health:*

I beg to report to you as follows on a careful examination of the estimates, plans and methods for mosquito extermination work in Nassau county for the year 1918 submitted for your approval by the Nassau county extermination commission as provided for section 412 of the Public Health Law, as amended by chapter 408 of the Laws of 1916.

The following maps and papers have been submitted by the commission for your approval:

1. Map showing mosquito breeding salt marshes in portions of Nassau county, N. Y., made for the mosquito extermination commission of area to be drained in 1918, prepared by Cornelius L. Both, city surveyor, dated August 12, 1917.

2. Map of Mill pond, Oyster Bay, N. Y., made for Nassau county mosquito extermination commission, showing character of adjacent areas, received at the State Department of Health, September 4, 1917.

3. Map of the Great swamp, Great neck, Nassau county, N. Y., made for the Nassau county mosquito extermination commission, showing possible systems of drainage, prepared by D. C. Will, C. E., and dated August, 1917.

4. A detailed schedule or statement of the plan of organization, outline of work and budget of estimated expenses for the year January 1, 1918, to January 1, 1919, dated August 27, 1917, and signed by Mr. John T. Pratt, president of commission.

5. Included in the detailed schedule noted under (4) is a general description of the lands which the commission proposes to enter upon to execute its plans and work, with the names of the owners thereof, as recorded by the last assessment rolls.

The general outline of the work for 1918 as proposed by the commission is as follows:

1. The continuation of the drainage of the south shore marshes, beginning at the point left off in the 1917 contract and continuing along the mainland as far east as Seaman creek.
2. The elimination of two large fresh water breeding areas in Great Neck and Oyster Bay.
3. The beginning of the fresh water drainage on the south shore, starting from the New York city line east to Mill river and Smith pond, just west of Rockville Center. The northern boundary, as shown on the accompanying map, would start on the west at the Merrick road and continue as far as Valley Stream. From there it would run far enough north to include Lynbrook.
4. Thorough maintenace of all salt and fresh water ditching on both the north shore and the south shore.
5. A systematic inspection and oiling in the six north shore districts, to include house-to-house inspections in the main villages.
6. Inspection and oiling of swamps and ponds on the south shore from the city line east to Freeport.
7. Map making, surveys and plans for the future.

The largest single item of proposed expenditures is $16,250 for 650,000 feet of ditching in salt marsh on the south shore at $.025 per foot, and the next largest item is $3,809 for cleaning 3,174,000 feet of salt marsh ditching on the south shore at $.0012 per foot, these two items taken together representing about 42 per cent of the total budget of $48,000. For 1918 the salt marsh drainage work proposed is to be carried on in the district on the south shore of Long Island, bounded on the west by Freeport creek, on the south by East bay, and on the east by Seaman's creek, and the district in which the work is to be done comprises an area of 2,000 acres of marsh adjacent to the upland. It is proposed by the commission to defer until 1919 the draining of the marsh islands south of this district.

The salt marsh district on the south shore mainland to be drained in 1918, is therefore contiguous to the areas drained under the 1916 and 1917 budget which in turn are contiguous to the areas drained by the Rockaway Peninsula Mosquito Extermination Corporation on the Rockaway peninsula, and to the Jamaica Bay district drained by the city of New York.

It is explained by the commission that the proportion of the amount annually expended which has been used in salt marsh drainage, namely, 50 per cent of the entire budget has not been a disproportionate amount, since the drainage of salt marsh land was the largest and most costly project confronting the commission, but that it is believed that for the year 1918 a sum smaller in proportion to the total funds to be expended should be used for salt marsh drainage, namely, about 42 per cent, in order that important fresh water drainage projects especially on the north shore which have necessarily heretofore been held in abeyance, should be undertaken. Considerable funds have of necessity been used up to the present time in oiling fresh water breeding places, especially on the south shore, but this expense can be eliminated with the filling or drainage of these fresh water areas. It is also stated that by the end of this year salt marsh drainage work will have been carried so far east that it will be necessary to carry on more fresh water work on the south shore than has been done in the past. Such a policy is evidently necessary to attain the full benefit of the salt marsh drainage accomplished.

The fresh water drainage project proposed for 1918 on the north shore includes as the most important portions of this work the drainage of Great Swamp at Great Neck, and the Mill pond at Oyster Bay.

Other work in fresh water marshes will be carried on on the Rockaway peninsula, largely in conjunction with work undertaken by property owners and at various points adjacent to the salt marsh drainage from the New York city line east. In addition to the Great Swamp and Mill pond projects on the north shore additional work is proposed for fresh water drainage on this shore. The territory in which this work is to be carried on is divided into districts, there being five on the south shore and six on the north shore.

The budget submitted for your approval provides for a total expenditure of $48,000 for the year 1918, the larger items being for field force, comprising 22.5 per cent of the total; new drainage projects, comprising 55 per cent of the total, and maintenance and patrol, comprising 11 per cent of the total. These three general divisions of the proposed expenditure comprise 88.5 per cent of the total budget.

Other items are for salary and expenses, permanent equipment and supplies, and the budget appears to have been carefully worked out and to be well balanced with a view to producing maximum results in the work undertaken.

The employees of the commission in addition to the secretary appointed by the commission are as follows:

Chief engineer,
Division engineer,
Assistant engineer,
Chief inspector,
Clerk and stenographer,
Eleven inspectors,
Three ditch patrol men.

A total of 20, not including laborers employed in cleaning ditches and in miscellaneous ditching and other work.

It is expected that about 60 per cent of expenditure will be devoted to the south shore and 40 per cent to the north shore.

It is proposed to continue the work of oiling carried on during previous years and to pay special attention as will be necessary from now on to the maintenance of the ditching already accomplished. It is estimated that at the beginning in 1918 approximately 3¼ million feet of ditching will have been cut and will require patrolling and cleaning, and it is proposed to take this work up as early in the spring as weather permits.

It is evident that very careful study has been given to the permanent organization and prosecution of the work of the commission, and while only a general inspection of the territory in which this work is to be carried on has been made and no attempt has been made to review in detail the probable cost of the different items of work projected for the year 1918, it is believed from a comparison with known costs and the allotment of funds for the several lines of work carried on at other places, that the estimates are reasonably correct, that the work has been carefully planned in accordance with chapter 408 of the Laws of 1916, and that the estimates, plans and methods fully merit your approval.

I would therefore recommend that the estimates, plans and methods as submitted, covering the year 1918, be approved and that in accordance with the provisions of section 412 of the act they be forwarded to the board of supervisors of Nassau county.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 6, 1917

The Board of Supervisors, Nassau County, N. Y.:

Dear Sirs.— In accordance with the requirements of section 415 of chapter 408 of the Laws of 1916, we have the honor of submitting the following report:

Our commission as at present constituted is composed of the following members:

John T. Pratt, Glen Cove, L. I., president.
Charles C. Adams, Lawrence, L. I., treasurer.
Arthur D. Jaques, M.D., Lynbrook, L. I.
Daniel A. Morrison, Freeport, L. I.
Anton G. Hodenpyl, Locust Valley, L. I.
Hiram R. Smith, chairman of the board of supervisors.

At the time of submitting our last report (August 28, 1916), the commission was working under a temporary organization.

On December 5, the commission adopted a set of rules and regulations governing the acts and affairs of the commission, providing for the election of its officers and prescribing their various powers and duties, fixing the time of the fiscal year, locating the offices of the commission and fixing the time of holding regular and annual meetings. The fiscal year designated by the commission begins on the 1st day of June and ends with the 31st day of May in each year. *Hence, this report is to June 1st*, 1917. On this date, December 5, 1916, the commission effected a permanent organization.

In the late fall of 1916, the Rockaway Peninsula Mosquito Extermination Corporation had completed 1,125,000 linear feet of ditching on the Rockaway peninsula in close proximity to the work installed by the city of New York, with funds raised by private subscription. In order to complete the work in this section and get the advantage of a contract at low cost, the commission extended this work to include islands number 10 to 18 inclusive, east of Broad channel and to East Rockaway creek, where the contract work contemplated by the commission in its 1916 budget begins. In this area the commission installed 139,639 linear feet of ditching at the extremely low cost of $2,443.68, or 1¾ cent per linear foot.

At the meeting of December 5, 1916, the commission let a contract for excavating and ditching 275,000 linear feet of trenches, more or less, on the marshlands adjacent to the uplands at a price of 2 cents per linear foot, and 225,000 linear feet of ditches, more or less, on the marsh islands adjoining, at a cost of 2.15 cents per linear foot, in accordance with plans and specifications submitted to and approved by the State Commissioner of Health. Under this contract the commission has installed in excess of 1,000,000 feet of ditching at an approximate cost of $21,000. (Note.— This work was completed subsequent to the closing of this report June 1.)

That the chief inspector and his staff might be in the best possible position to lay out and superintend this work, early in the present year the commission opened a field office at East Rockaway, L. I. This office is conveniently located near the central point of the work on the south shore and is furnished with a thorough equipment for mosquito extermination work.

It is with considerable satisfaction that we view the situation on the south shore of our county at this time. The city of New York has completed the ditching and draining of its marsh land in the Jamaica bay section. Approximately 5,000,000 feet of ditching have been installed, draining an area of 5,000 acres.

The Rockaway Peninsula Mosquito Extermination Corporation has completed the ditching on the Rockaway peninsula, draining an area of more than 3,000 acres of marsh lands.

The contract of the Commission on the marsh islands drained approximately 400 acres, and the 1916 contract work will install ditches throughout an area of 3,000 acres.

While the progress of this drainage work seems quite satisfactory, we must not lose sight of the fact that it completes only about 33 per cent of the entire work on the south shore meadows, and satisfactory results cannot reasonably be looked for from this work until the remaining two-thirds of the meadows have been ditched.

On the north shore the commission has been confronted with a somewhat different problem. In addition to certain salt marsh lands in different localities, there has been in each season a certain amount of malaria prevalent in nearly every community. So, on the north shore, emphasis has been placed on the study of malaria and its prevention.

In 1916 the commission continued the work and plans of local organizations in Great Neck, Manhasset, Plandome, Port Washington, Roslyn and Locust Valley. The results accomplished in these villages have shown the possibility of the elimination of malaria from the north shore in a short time. In 1916 no cases were reported in Plandome where, in previous years, malaria had been prevalent. For the entire season there were on the average in each village less than ten cases, including recurrent cases. This is a very marked decrease from 1915, and at least a 75 per cent decrease from 1914, previous to any anti-mosquito work in these localities. This has been made possible by a careful planning of mosquito extermination, using the well accepted methods used in Panama, and elsewhere. This consists of (1) careful inspection of all fresh water swamps, pools and ponds; (2) drainage, when possible, of all swamps and the cleaning of the edges of ponds to keep them free from grass and any kind of vegetation; (3) temporary oiling of all places where either of the above is impossible.

From August 28, 1916 (date of last report), to June 1, 1917, the following amounts were expended in fresh water drainage:

	1916	1917
Manhasset, Plandome, Port Washington	$235 12	$9 36
Roslyn	.....	24 00
Locust Valley	562 14	.....
Glen Cove	604 12	41 50
	$1,501 38	$74 96

These expenditures are for the closing of the season of 1916 and the beginning of 1917, and do not include the drainage planned for 1917 and now under way.

Salt Marsh Ditching.— There are approximately 125,000 feet of ditching on the north shore, all of which had been thoroughly cleaned in 1917, and about 1,000 feet of supplemental ditching cut. The cost of cleaning the old ditches in the spring of this year and the additional ditching was $196.06.

A survey has been made on the north shore marshes to plan for the additional ditches needed in Great Neck, Locust Valley and Oyster Bay, to be installed this year.

Oiling.— The oiling begins coincident with the fresh water breeding, which does not occur to any great extent previous to June, so that only a limited amount of oiling has been done to date (June 1, 1917). In 1916 all the breeding places on the north shore in the village named above were oiled regularly about every two weeks. Sixty barrels of oil were used in this work at a cost of $253.09.

House-to-House Inspection.— In addition to the inspection of swamps, pools and ponds, a systematic inspection from house to house was made of all breeding places in Locust Valley, Glen Cove, Roslyn and Oyster Bay.

The following is a list of breeding places found:

	Roslyn	Locust Valley	Glen Cove	Oyster Bay
No. of Houses	578	395	997	497
Actual and probable breeding places:				
Cisterns	29	11	....	....
Cesspools	11	5	....	....
Toilets	23	3	....	....
Barrels	29	41	....	....
Open Drains	8	1	....	....
Miscellaneous	28	13	....	....
	128	74	49	85

Along with the inspections instruction has been given to residents as to the mosquito problem and its control. This has proved an invaluable aid in securing the cooperation of the public.

In the central section of the county there has been comparatively little work

done to date. The number of breeding places found upon our investigations thus far has not been large and many of these are being gradually eliminated by property owners as the mosquito problem becomes better understood.

At Woodbury two ponds and a large piece of marshland were successfully drained under the supervision of the commission at a cost of $3,845, the entire expense being contributed by neighboring property owners.

Investigations by the commission lead to the conclusion that 90 per cent of all the mosquitoes in the county breed on the salt marshes. The elimination of this breeding will prove beneficial to the central part of the island, also as the salt marsh species are migratory.

The following is a correct list of the amount of money expended by the commission from August 28, 1916, the date of the last report to the present time, June 1, 1917:

Claim No.		
8	Inquirer, books and stationery	$41 77
9	Stella Rode, typewriting	6 70
10	G. Bennet Smith, purchase of bicycles	270 00
11	Great Neck Assoc., tools, oil, etc	569 83
12	Walter R. Talbot, salary and expenses	69 25
13	Russell W. Gies, engineer	222 99
14	Sarah Ehrenberg, typewriting	25 00
15	P. L. Buttrick, surveying	165 00
16	Howard C. Bennett, labor wages	544 91
17	C. G. Braxmer Co., badges	18 11
18	Otto C. Vogler, surveying	50 25
19	Otto C. Vogler, surveying	7 96
20	Edward Springmann, expenses	16 05
21	W. H. DeMott, expenses	5 32
22	Joseph Casey, horse hire	3 00
23	Roslyn News, printing	9 85
24	Charles Yost, auto tires	20 35
25	Joshua T. Hicks, rubber boots	31 50
26	Conklin, Lubby & Conklin, tools	15 41
27	Jas. H. Hamilton & Son, teams	63 96
28	Hewlett & Remson, sundries	24 28
29	Howard C. Bennett, miscellaneous items	71 22
30	Howard C. Bennett, labor payroll, etc	719 80
31	Library Bureau, stationery	3 59
32	C. C. Adams, postage	5 00
33	W. R. Talbot, salary and expenses	64 52
34	Great Neck Assn., labor	24 53
	Payroll for August:	
	Nelson V. Smith, inspector	100 00
	Jas. E. Parkinson, inspector	100 00
	W. H. DeMott, inspector	100 00
	C. A. Smith, inspector	100 00
	Jas. Molloy, inspector	100 00
	Louis J. Monico, inspector	100 00
	Theo. Painter, inspector	100 00
	Edw. Springmann, inspector	100 00
	M. E. Townsend, inspector	100 00
35	Great Neck Assn. labor	15 32
36	P. L. Buttrick, engineering	37 50
37	Standard Oil Co., oil	133 45
38	A. F. Mills, account books	4 20
39	H. C. Hegeman, insurance	71 25
40	Village of Lawrence, oiler and helper	135 15
41	Daniel E. Sealy, typewriting	39 85
42	Chester Painter, expenses	45 30
	Salary July and August	225 00
43	John Lee, teams and labor	92 00
44	L. J. Monico, expenses	1 96
45	Owen Divine, labor	33 75

46	Inquirer, publishing	$27 00
47	New Era and Malverne News, publishing	27 00
48	Sp. Side Observer, publishing	25 50
49	J. R. Firth, typewriting	8 25
50	Glen Cove Echo, publishing	27 00
	Payroll for September:	
	C. Painter, secretary	150 00
	N. V. Smith, inspector	100 00
	J. E. Parkinson, inspector	100 00
	W. H. DeMott, inspector	100 00
	G. A. Smith, inspector	100 00
	J. Molloy, inspector	100 00
	Theo. Painter, inspector	100 00
	M. E. Townsend, inspector	100 00
	Edw. Springmann, inspector	50 00
	L. J. Monico, inspector	100 00
51	Stella Rode, typewriting	8 10
52	G. A. Smith, expenses	7 43
53	C. C. Vogler, labor payroll	111 34
54	Isaac Hicks, lumber	4 00
55	J. A. Hamilton & Son, team	69 65
56	Conklin, Lubby & Conklin, tile, etc	34 57
57	R. S. V. Fuller, tools	12 30
58	Owen Divine, labor	6 75
59	Hewlett & Remson, gas and oil	19 95
60	J. T. Hicks, rubber boots	18 75
61	Frank Faraco, teams	56 00
62	R. W. Gies, expenses	6 45
63	Howard C. Bennett, labor payroll	689 24
	Payroll for October:	
	C. Painter, secretary	150 00
	N. V. Smith, inspector	100 00
	J. E. Parkinson, inspector	100 00
	W. H. DeMott, inspector	100 00
	Jas. Molloy, inspector	100 00
	G. A. Smith, inspector	100 00
	M. E. Townsend, inspector	100 00
	L. J. Monico, inspector	100 00
	Theo. Painter, inspector	100 00
64	C. Painter, expenses	37 46
65	Otto C. Vogler, salary and expenses	66 90
66	Standard Oil Co., oil	65 08
67	John Lee, team hire	24 00
68	Jos. Casey, team hire	3 00
69	Great Neck Assn., tools, etc	5 30
70	C. C. Adams, incidental expenses	2 30
71	O. C. Vogler, labor payroll	65 06
72	O. C. Vogler, salary and expenses	47 52
73	L. O. Wilson, cartage	2 23
74	J. R. Finch, typewriting	8 25
75	J. A. Hamilton & Son, team hire	3 50
76	F. P. Noble, surveying	15 00
77	Downing Bros., lumber, rope, etc	30 94
78	H. G. Bennett, labor payroll	430 93
	Payroll for November:	
	C. Painter, secretary	150 00
	W. H. DeMott, inspector	100 00
79	John Guthiel, teams	14 00
80	O. C. Vogler, salary and expenses	11 79
81	D. E. Sealey, typewriting	24 95
82	E. M. Kernan, typewriting	12 80
83	National Surety Co., bond	25 00

84	H. C. Bennett, salary and expenses	$53 02
85	Rock. Pen. Mosq. Ext. Corp., survey, tools	44 50
86	C. L. Both, expenses	4 69
	Payroll for December:	
	C. Painter, secretary	150 00
	P. L. Buttrick, chief inspector	196 02
	O. C. Vogler, inspector	108 81
	W. H. DeMott, inspector	100 00
87	E. I. Everett, wages	12 00
88	Charles Yost, repairs, auto	24 65
89	A. F. Mills, record books	3 95
90	Inquirer, printing	4 70
91	S. T. Sealy, taxi hire	12 75
92	Stella Rode, typewriting	8 00
93	P. L. Buttrick, expense account	19 29
94	Keuffel & Esser Co., supplies	18 80
95	Hull & Deppisch, seal, etc	2 80
96	C. Painter, traveling expenses	14 83
	Payroll for January:	
	C. Painter, secretary	150 00
	P. L. Buttrick, chief inspector	225 00
	O. C. Vogler, inspector	125 00
	W. H. DeMott, inspector	100 00
97	W. H. Nobman, supplies	1 70
98	Lufkin Rule Co., chain tape	3 40
99	Inquirer, stationery	4 50
100	I. Henry Kirby, map	10 00
101	Hansen & Coulter, plans, etc	10 24
102	Stella Rode, typewriting	19 50
103	C. L. Both, maps	60 50
104	Otto C. Vogler, expenses	1 57
105	W. H. DeMott, supplies	5 71
106	P. L. Buttrick, expenses	57 26
107	Waring, Chapman & Farquhar, contract	3,958 00
108	Keuffel & Esser Co., supplies	1 34
	Payroll for February:	
	C. Painter, secretary	150 00
	P. L. Buttrick, chief inspector	225 00
	Otto C. Vogler, inspector	125 00
	W. H. DeMott, inspector	100 00
109	S. T. Sealy, labor	46 75
110	D. E. Sealey, typewriting	28 90
111	Roslyn News, publishing	26 25
112	Roslyn News, printing	40 75
113	Hegeman & Mott, insurance	71 25
114	Nassau County Review, publishing	196 08
115	Stella Rode, stenographer	15 40
116	P. L. Buttrick, expense account	54 20
117	C. S. Hammond & Co., maps, etc	24 04
118	Keuffel & Esser Co., supplies	3 85
119	Keuffel & Esser Co., supplies	41 32
120	A. E. Beegle, blue prints	10 00
121	D. E. Sealey, typewriting	9 50
122	C. L. Both, map drawing	162 25
123	Chas. Davison Estate, lumber	11 25
124	Edw. Casey, auto and motor cycle	774 50
125	P. L. Buttrick, expenses	94 00
126	Stella Rode, typewriting	8 74
127	S. T. Sealy, labor	54 00
128	S. T. Sealy, taxi	49 50
129	S. T. Sealy, labor	12 50
130	H. C. Bennett, services and expenses	56 08

131	Rock, Pen. Mosq. Ext. Corp., contract	$2,443 68
132	J. E. Albright, typewriting	37 50
133	Hicks & Watts, furnishings	7 94
134	L. H. Schneider & Son, shades	3 70
135	Queensboro Gas & Electric Co., heaters	21 60
136	Keuffel & Esser Co., supplies	2 61
137	Keuffel & Esser Co., supplies	5 38
138	Postal Tel. & Cable Co., furniture	17 00
139	Postal Tel. & Cable Co., furniture	67 93
140	R. W. Gies, engineering services	115 00
	Payroll for March:	
	C. Painter, secretary	150 00
	P. L. Buttrick, chief inspector	225 00
	O. C. Vogler, inspector	125 00
	W. H. DeMott, inspector	100 00
141	Richard Douglas, supplies	25 25
142	Thos. F. Day, 4 row boats	100 00
143	F. M. Abrams, office rent	20 00
144	Weiner Press, stationery	2 50
145	Standard Oil Co., oil	54 56
146	D. E. Sealey, typewriting	32 40
147	C. Painter, expenses	27 55
148	W. H. Raynor, blue prints	10 00
149	P. L. Buttrick, expenses	82 64
150	Stella Rode, typewriting	6 22
151	Frank F. Bassett, auto repairs	52 43
152	M. P. McNamara, stationery	14 50
153	S. T. Sealy, use of car	38 00
154	S. T. Sealy, labor, etc	25 40
155	H. I. Eaton, ditching spades	50 00
157	M. M. Kennerly, lectures and exam	50 00
158	N. J. Pettit, insurance	31 82
159	Theo. Albro, boat hire and labor	52 55
	Payroll for April:	
	C. Painter, secretary	150 00
	P. L. Buttrick, chief inspector	225 00
	O. C. Vogler, inspector	125 00
	W. H. DeMott, inspector	100 00
	C. F. Dowkontt, inspector	70 89
	F. E. Parkinson, inspector	76 80
	H. A. James, inspector	76 80
	Samuel T. Sealy, inspector	76 80
	Edw. Butchard, inspector	76 80
	W. H. Post, inspector	19 20
	Theo. Painter, inspector	19 20
	G. A. Smith, inspector	19 20
	H. S. Baumann, inspector	19 20
	H. A. Park, stenographer	17 14
159	Leonard Combs, inspector	125 00
160	P. L. Buttrick, labor payroll	207 64
161	P. L. Buttrick, labor payroll	243 75
162	P. L. Buttrick, labor payroll	100 00
163	P. L. Buttrick, labor payroll	206 25
164	P. L. Buttrick, labor payroll	97 52
165	P. L. Buttrick, freight on oil	4 10
166	Mrs. L. Combs, horse, wagon, etc	100 00
		$23,118 16

Respectfully submitted,

JOHN T. PRATT,
President

CHESTER PAINTER,
Secretary

OTHER SPECIAL INVESTIGATIONS

During the year several additional special lines of work were carried on including inspection work in cooperation with military authorities in the matter of sanitation of military training camps and extra-cantonment zones, airplane stations, naval bases and coast patrol stations, especially those located on Long Island; inspection of water supply and sewage disposal facilities and general sanitary conditions at proposed sites for county tuberculosis hospitals; conferences with the State Architect, the State Engineer and the Fiscal Supervisor of State Charities regarding appropriations to be requested of the Legislature for improvements in sanitary conditions at state institutions and the preparation of plans for the engineering work involved.

The work of inspection at military camps has required visits by the chief engineer and considerable attention by the principal assistant engineer in inspections at some twelve military camps, airplane stations, naval bases and coast patrol stations. The work undertaken has also involved a sanitary survey of Port Jefferson where arrangements are under way to improve defective and inadequate sewerage facilities.

Through arrangement with the County Tuberculosis Hospital Committee assistance has been rendered county authorities in the selection of sites for county tuberculosis hospitals required to be established under recent legislation. Inspections were made of 100 possible sites for hospitals in 13 counties, the work of the Engineering Division relating to the provisions for adequate water supplies of satisfactory sanitary quality and to the question of proper disposal of sewage on the sites under consideration.

In connection with the improvement of sanitary conditions at state institutions, the Engineering Division has cooperated with the State Architect and the State Engineer in determining upon feasible plans for water supply and sewage disposal for state institutions such as at Wingdale, the Marcy Division of the Utica State Hospital, Kings Park, the Creedmoor Farm of the Brooklyn State Hospital and at various other state institutions. This work

has also involved numerous conferences with reference to estimates of appropriations needed to carry out the proposed work at these and other state institutions.

During the year, also, the services of a temporary inspector employed in the Department were lent to the Lake George Association for a period of eight weeks during which time a detailed sanitary survey of some 300 properties adjoining and adjacent to the lake were made with a view to improving sanitary conditions.

An extensive investigation was carried on during the summer and fall of the alleged emission of smoke, gases, fumes and vapors from chemical and other manufacturing plants on the west side of the Hudson river in the Borough of Edgewater, N. J., with a view to determining whether said fumes were carried across the river to New York city. A further hearing is to be held in this matter for consideration of the conclusions reached during this investigation.

Some twenty lectures and addresses on sanitary engineering topics were given by members of the division staff in courses on public health and sanitation and before civic bodies and mass meetings in municipalities. Other education work of the Department has required the preparation by the Engineering Division of a large number of maps, charts and diagrams.

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